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Straw Bale Gardening

Grow your own
fresh vegetables just
about anywhere!

Extend your growing
season with heat-
producing straw bales

Protect your plants
from pests, diseases,
and weeds

John Tullock

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No one likes a know-it-all. Most of us realize there's no such thing—how could there be? The world is far too complicated for someone to understand *everything* there is to know. So when you come across a know-it-all, you smile to yourself as they ramble on because you know better.

You understand that the quest for knowledge is a never-ending one, and you're okay with that. You have no desire to know everything, just the *next* thing. You know what you don't know, you're confident enough to admit it, and you're motivated to do something about it.

At *Idiot's Guides*, we, too, know what we don't know, and we make it our business to find out. We find really smart people who are experts in their fields and then we roll up our sleeves and get to work, asking lots of questions and thinking long and hard about how best to pass along their knowledge to you in the easiest, most-accessible way possible.

After all, that's our promise—to make whatever you want to learn “As Easy as It Gets.” That means giving you a well-organized design that seamlessly and effortlessly guides you from page to page, topic to topic. It means controlling the pace you're asked to absorb new information—not too much at once but just what you need to know right now. It means giving you a clear progression from easy to more difficult. It means giving you more instructional steps wherever necessary to really explain the details. And it means giving you fewer words and more illustrations wherever it's better to show rather than tell.

So here you are, at the start of something new. The next chapter in your quest. It can be an intimidating place to be, but you've been here before and so have we. Clear your mind and turn the page. By the end of this book, you won't be a know-it-all, but your world will be a little less complicated than it was before. And we'll be sure your journey is as easy as it gets.

A handwritten signature in black ink that reads "Mike Sanders". The signature is written in a cursive, flowing style with a large, stylized "M" and "S".

Mike Sanders
Publisher, *Idiot's Guides*

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Straw Bale Gardening

by John Tullock



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Publisher
Mike Sanders

Executive Managing Editor
Billy Fields

Developmental Editorial Supervisor
Christy Wagner

Development Editor
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Laura Merriman

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Janette Lynn

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Julie Bess Martin

Proofreader:
Laura Caddell

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Introduction

There's a simple joy to growing your own food, and an increasing number of households are realizing that enjoyment, planting backyard gardens and raising their own vegetables, fruits, and herbs. In fact, studies indicate that the percentage of households who grow at least some food has increased steadily over the past decade. And while you might know how to till some soil and plant a crop in the ground or a raised bed, straw bale gardening might be a completely new way of gardening to you.

Straw bale gardening enables you to grow vegetables, herbs, and other plants easily, without the need for any digging, tilling, or constructing anything more complicated than a trellis. A straw bale garden fills a variety of situations and needs, is relatively inexpensive, allows for an extended growing season, reduces the incidence of crop diseases, and so much more. Because the straw bale becomes both container and growing medium, you are freed from the expense of installing a traditional garden.

You can "plant" your straw bales just about anywhere, even on a concrete surface if that's where the sun shines longest during the day. Add fertilizer, water daily, monitor the temperature of the bales, and plant when the bales are ready. Your crops grow and thrive in the bales, free of weeds and many of the pests you encounter when growing in soil. Impossible to overwater, and resistant to drying out, the straw bale garden is forgiving of the inevitable mistakes new gardeners make. And at the end of the season, nothing remains but composted straw, which can be used elsewhere in the landscape.

Gardening in general, and vegetable gardening in particular, is practiced all over the world by many levels of gardeners. Naturally, an abundance of often-conflicting information exists on myriad subjects, even those as simple as soil preparation. Therefore, it's my assumption throughout this book that you are interested in growing a small garden for your family kitchen in a sunny corner of your suburban backyard or city hardscape. The emphasis is on obtaining quality, variety, and seasonal abundance from plants appropriate to the climate and circumstances available. With a minimum of investment and some forethought, any home gardener can do better with a given crop such as tomatoes than many commercial growers.

The straw bale method is simple, and anyone should be able to master it in one season. If you add a little more or less nitrogen than recommended, or forget to water one day, it won't much affect the outcome of the garden. This is perhaps the greatest advantage for the novice gardener.

My garden in Tennessee, in USDA Zone 6b, grows at 36°N latitude. We experience hot, humid summers and relatively mild winters, although the thermometer does occasionally dip below 0°F (−17.75°C). The climate, soil conditions, and topography permit gardeners in this region to grow a wide variety of vegetable and fruit crops. Much of the advice given here has been gleaned from personal experience and from communicating with fellow gardeners for more than 40 years.

I encourage you to give straw bale gardening a try, even if you already garden in the ground or in raised beds, but especially if you don't. With this helpful guide by your side, you're sure to avoid mistakes and reap a bountiful reward.



Acknowledgments

I could never have written this book without the support and help of my husband and best friend, Jerry Yarnell, as this year we celebrate four decades of partnership and love. Those are his hands in many of the photographs, and he deserves the credit for our abundant vegetable harvest. Thanks to my agent, Grace Freedson, for her always thoughtful efforts, and to Tom Stevens, senior acquisitions editor, for extending the opportunity to write this book. Development editorial supervisor Christy Wagner shepherded the book through its early phases, and development editor John Etchison and designer Laura Merriman have been thoroughly professional and a pleasure to work with throughout the project, which they markedly improved from its initial state. Dr. Susan Hamilton, James Newbern, and Holly Jones all helped make The University of Tennessee (UT) Gardens an indispensable resource for ideas and images throughout the book. Special thanks to Holly for all her hard work on the UT Vegetable Garden. Thanks also to Graham Byars, who generously devoted garden space to straw bale projects and allowed me free access to photograph them. Lisa and Monte Stanley were unfailingly helpful in allowing me to photograph plants at their excellent garden center.



SECTION 1

Straw Bale Gardening Basics

Straw bale gardening enables you to grow your own food in less space, with less work, using less water and fertilizer, than any other method of gardening. All you need are straw, water, fertilizer, and plants to grow a thriving garden with minimal effort.

Growing food continues to increase in popularity, as backyard gardeners discover the benefits of fresh, wholesome produce grown naturally. Various methods for increasing yield from limited-space gardens have been developed, including square-foot gardening, raised-bed gardening, and container gardening. Straw bale gardening combines the best features of these other methods to make growing home-grown food easier than ever.

With straw bale gardening, the bale is both raised bed and growing medium. Its uniform structure remains evenly moist while supporting plant roots, and its decomposition—with a little help from you—provides all the nourishment the plants need. The soil-less method also means no weeds to compete with crops!

Keys to Successful Gardening



People everywhere are growing more of their own food at home. Some backyard gardeners want to avoid pesticides and genetically modified ingredients found in manufactured foods. Others just like the flavor of fresh, homegrown vegetables or want a broader variety of vegetables than their local market offers. Some people enjoy the feeling of self-sufficiency a vegetable garden provides, while others might think the health benefits of outdoor exercise and plenty of nutritious vegetables make a garden worthwhile.

No matter the reason or the type of garden, all plants have the same basic requirements for growth—sunshine, water, air, and nutrients. Providing each of these in the right amount and at the right time is essential for a successful garden and a bountiful harvest, be it flowers, apples, or lettuce.

WHAT PLANTS NEED

Food crops—the focus of this book—need at least 6 hours of sun per day, and more if possible. They also need about 1 inch (2.5cm) of water per week, which you must supply via irrigation if rainfall is insufficient during the growing season. Plants also need proper air circulation as a hedge against diseases and pests, and they must have certain elements from the growing medium, or fertilizer.

In much of the United States, the growing season is more than 200 days, meaning multiple harvests of some crops are possible. In areas where winters are mild, you might have four seasons of harvest without resorting to special facilities such as greenhouses, cold frames, and so on. In colder locations, or those at extreme latitudes, conditions might be inhospitable to certain crops, but you should still be able to grow a reasonable assortment of vegetables and herbs.

I live in Tennessee, in USDA Zone 6b, where winters can reach 0°F (−18°C) degrees, and summers are typically hot and humid. Vegetable and herb varieties that perform well here might not grow at all farther north.

Fortunately, all the various types of lettuce, for example, are grown in the same manner, so what works for me in Tennessee will likely work for you, just about wherever you live. The individual vegetable and herb listings in later sections of this book cover vegetables by species, and named cultivars (a contraction of cultivated variety) are omitted. With hundreds of lettuce cultivars from which to choose, you're sure to find one that performs well in your area.

LITTLE TO NO EXPERIENCE REQUIRED

You don't have to have a lot of gardening experience to grow a straw bale garden. If you're just starting out, don't be intimidated by the thought of conditioning your bales, planting seeds or seedlings, watering, and fertilizing. You'll learn what you need to know as you progress through this book and get some hands-on experience in your own garden.

But you need not repeat others' mistakes. Talk to other food gardeners in your area—they're probably easy to locate using social media. If that seems daunting, seek advice from your local garden center. And be sure to read about the vegetables you most want to grow. This book is a great start, and plenty of additional information is available in your local library and online.

Because a straw bale garden helps you avoid many of the mistakes beginners often make, it's an ideal way to “get your hands dirty” planting and growing a garden.

All gardening is local, so when choosing specific plants for your garden, seek local advice on which plants will do best where you live.

Understanding Straw Bale Gardening



Straw bale gardening offers the option of growing food without a lot of prior experience, not much expense, and very little time investment (after the initial setup). But depending on the space you have available, a straw bale garden can produce an amazing amount of food.

Not all vegetables perform at their peak when grown in straw bales, but many do, and those are featured in this book. Straw bale gardens are not appropriate for perennial vegetables, like asparagus or horseradish, either. But for the majority of vegetables and annual herbs, straw bale gardening offers a quick and easy introduction to growing food for the novice—and can be an interesting supplement to what more experienced gardeners already know.

Because you can set up a straw bale garden anywhere it can get enough sunshine—even on a concrete driveway—it's a good approach for someone who is renting or doesn't have a suitable sunny spot in which to plant. And cleanup is easy; at the end of the season, all that's left is a pile of rich compost.

ADVANTAGES OF STRAW BALE GARDENING

Straw bale gardening has many advantages—as you’ll discover here and throughout this book—but only a few disadvantages. Let’s start with the advantages.

Easy and Inexpensive

With straw bale gardening, you just set the bales where you want them and start growing. And because you plant in the bale itself, there’s no expensive growing medium to buy—you can spend your money on fertilizer and seeds or plants instead! What’s more, straw bales are cheap and widely available.

Earlier Planting Time

You can plant earlier in straw bales, which is especially handy in cooler climates. Because the decomposition that takes place during the conditioning process causes the interior temperature of the bale to rise, you can start your plants earlier than you could if you were planting them in the cooler ground.

Requires Less Water

Another plus is that plants grown in a straw bale don’t need to be watered as often as plants grown in soil. Straw bales retain a huge amount of moisture, yet admit oxygen vital to plant roots.

Weed Free

And you can forget about weeding! Unlike soil, straw bales don’t come with weed seeds included, ready to germinate and compete with your crops. Your straw bale garden will remain weed-free without pulling or hoeing.

Clean and Easy Harvest

When it comes time to harvest, straw bale gardening provides a clean and convenient means for accessing your crops. Because you didn’t plant in soil, you don’t have to worry about dirt clinging to your harvested vegetables.

DISADVANTAGES OF STRAW BALE GARDENING

Now for a few disadvantages you need to know about:

Limited Lifespan

Because the technique depends on decomposition of the bale, a straw bale garden lasts only for a single season. This makes it unsuitable for perennial crops like asparagus.

Groundcover Required

It’s best to plant your garden on a layer of mulch or landscape fabric, or atop closely mowed grass, to keep nearby grass and weeds from growing into your straw bale garden.

Ideal for Any Space

If you have a small yard, you might have only patches of sunshine, especially if you have large, mature trees. But look around to see where else you could plant a straw bale garden. Anywhere the sun shines reliably for 6 hours or more per day during the growing season is a potential garden site, even in the smallest yard.

Typical bales of straw are about 2 feet (.5m) square on the ends and 4 feet (1.25m) in length. That means you don't need a lot of space to plant one. It also means one bale of straw provides about 8 square feet (2.5 square meters) of growing area—which can provide more food than you might at first imagine. You can grow three tomato plants in one bale, for example, or several dozen carrots. Four bales typically produce enough vegetables for two people during the growing season, if they're planned well and the plants are properly cared for.

DESIGN FLEXIBILITY

As long as the sunshine requirement is met, you can arrange bales in any design you like: straight rows, U shapes, blocks, stair steps, or whatever design works best for your space.

If your site is sloped, run the bales parallel to the slope, regardless of their compass orientation. If you run them perpendicular to the slope, gravity can encourage them to topple.



Straight lines If you opt for a straight line design, arrange your bales in a line running north and south if possible. This setup ensures that both sides of the bales receive the same amount of sunshine. Lopsided growth not only looks unappealing, but also leaves the bale in danger of toppling in a stiff wind. This is especially true of plants grown on a trellis, such as peas, and those that grow tall, such as okra.



U shapes and blocks A U-shaped garden squeezes three bales into the smallest possible space—about 4 by 8 feet (1.25 by 2.5m). A solid block of three or four bales is possible, provided they're accessible from all sides. With such arrangements, any trellis you use must be on the north side of the patch to avoid shading the other crops when the trellis is covered with vines.

In the middle of a four-bale arrangement, you'll have an empty space about 2 feet (.5m) square. You could fill this area with soil and plant sunflowers or herbs, increasing your total gardening space.



Stacks Stacking bales like stair steps is another space-saving strategy. As a general rule, for stability, stack only one bale deep for every two bales tall. If you want to add a third bale, place it in front of the bottom bale, making the stack two deep.

Stacking bales allows you to elevate your garden to a more convenient working height, which is especially helpful if you have difficulty bending over. A single row of bales sits approximately 2 feet (.5m) above the ground, a convenient height for a garden stool, which keeps you off your knees.

Plant taller plants, like tomatoes or pole beans, in the upper tier, and nestle smaller items, like parsley or carrots, in the lower level. In this arrangement, the taller side should face north. On the backsides of those bales, try herbs or summer lettuces. You also could plant cucumbers on top, and instead of using a trellis, just allow them to drape down the back and front of the bales.



Depending on how tightly they're packed, some bales might decompose more or less quickly. If the process goes too rapidly, stacked bales can begin to collapse. Be sure any bales you select for stacking are very tight and weigh approximately 50 pounds (22.5kg).

PORTABILITY

The position of the sun relative to a fixed point on the earth's surface changes with the cycle of the seasons. Gardeners whose space is surrounded by tall trees or buildings may be confronted with a sunny spot in the spring that changes to a shady spot by midsummer.

Gardening in the ground or in raised beds requires you to work with the available soil in a fixed spot that receives sufficient sun. A portable straw bale garden is much more flexible and can be moved from one spot to another as the season progresses. This level of convenience requires advance planning, but it pays off in greater productivity later in the season.

To move your bales, a wheelbarrow is very helpful. But if you don't have one, you can use a sheet of carpet, fabric, heavy plastic, or a tarp. Cut the material to fit, leaving an extra few feet on the long side of the bale to be used as a handle. You can roll up this excess and secure it near the base of the bale in a variety of ways. When you need to move your garden, simply unroll the material and drag the bale, plants and all, to its new location.



Be very careful while you're moving your bales. You don't want to tip them over and damage your plants.

PERFECT FOR RENTERS

If you rent your home, a straw bale garden makes sense because it leaves little to no impact on the property. Given that straw bales can be set up almost anywhere, even on a concrete or gravel surface, the options for growing food without disrupting the existing landscaping or lawn increase significantly. And because the straw bales leave nothing behind but compost, even an area of lawn that's killed by the bale garden will return vigorously when reseeded.

Be sure you get your landlord's permission, in writing, before setting up a straw bale garden, though. He or she is likely to grant permission for your garden once you explain nothing will be done to reduce the property's value—and you offer some of your fresh harvest, too!

NOT JUST VEGGIES

Straw bale gardens are not just for veggies, although that is the main focus of this book. If you are concerned about the “rustic” appearance of straw bales, just include some flowers and foliage plants right along with your crops. Because you can plant the ends and sides of the bales as well as the tops, you can decorate the bales holding your tomato plants with a bright array of flowering annuals. Some good ones to try are French marigolds, Madagascar periwinkle, petunias, begonias, and lobelias. These remain compact and won't compete with your vegetables. Check at your local garden center for additional ideas.



Unique Planting Opportunities

With straw bale gardening, you're not limited to one crop in a fixed space. You have three dimensions in which to plant all kinds of vegetables, fruits, and herbs.

ON THE SIDE

Sure, you can plant in the tops of your straw bales after you've conditioned them, but don't stop there. The sides and ends of the bales can be home to smaller plants, too.

During cool weather, tuck various small varieties of butterhead lettuce here and there into the sides of the bales. When the weather warms, replace the lettuce with another crop, such as everbearing strawberries.

Numerous herb varieties can also be stuck in unused portions of the bale. Try Greek basil, which typically forms a small, rounded clump, and cilantro, which seems able to grow during any season but the coldest parts of winter.

Flowers, too, can adorn your straw bale beds. Among the best choice for warm weather are the French marigolds. Many cultivars remain quite small and form tight mounds covered with blooms from summer to fall. Marigolds are good for attracting pollinators and are said to repel some insect pests. They're also edible, although some cultivars do not taste very good.



Possibly the best flowers for the cool season straw bale garden are the many viola hybrids. Commonly called “Johnny jump-ups,” they form small, floriferous clumps, tolerate freezing weather, and keep blooming well into late spring, only surrendering when the weather becomes really hot. They’re also edible and generally delicious, with a flavor resembling cabbage.

PLANT COMBINATIONS

When planting different types of vegetables, herbs, or edible flowers in the same straw bale, it’s worthwhile to note that some combinations are better than others because the plants complement each other instead of competing.

Perhaps the classic companion planting scheme is the “three sisters,” practiced by Native Americans centuries before Europeans arrived in the New World. Here, corn, beans, and squash are planted together in the same spot. The beans climb the corn for support, and the squash twines around them, acting as a living mulch. The beans provide nitrogen, in high demand by the corn and squash, and the three crops together provide much in the way of a balanced diet.

You can replicate a straw bale version of this theme if you choose the right cultivars. Opt for a smaller corn cultivar so the bale doesn’t become too top heavy. For the beans, select a “half-runner” type—basically a compromise between a bush bean and a pole bean that reaches perhaps 4 feet (1.25m) in height. For the squash, select a bush form of summer or winter squash or a bush cucumber. All these plants will remain in bounds and create an interesting and productive bale garden.

Numerous other good plant combinations exist. Lettuce grows well with scallions and carrots, tomato plants thrive alongside basil, and sweet potatoes can be used as a living mulch for okra. In all cases, remember that the straw bale garden will do best if you use compact-growing varieties.

Raised Beds Versus Straw Bales

Raised growing beds have been popular among vegetable gardeners for several decades now, and they have their adherents among ornamental growers as well.



DRAWBACKS OF RAISED BEDS

Although touted as the answer to all problems of vegetable horticulture, raised beds have a few significant drawbacks.

First, they're costly to build and maintain. In addition to the cost of the lumber and other construction materials, you have to supply the growing medium as well. Prices vary for soil mixtures, depending on what's used, the quantity purchased, and so forth, but can easily exceed the cost of the bed itself.

In addition, raised beds actually reduce productivity for a given crop, when compared to growing that crop directly in the ground. In fact, nothing beats an in-ground garden patch for productivity. But you have to consider spacing. If plants in the ground are spaced closely together, as they are in raised bed gardens, their productivity suffers, too. So the main advantage of raised beds is their efficient use of space, not the greater number of vegetables you can harvest from them.

Many people have concerns about using pressure treated lumber to construct vegetable beds. Copper, chromium, and arsenic are typically present in the preservative that's used to treat lumber, and you should take precaution when working with this product, as inhalation or ingestion of the sawdust is potentially harmful. Some people believe the preservative can escape the wood and contaminate vegetables, while others maintain this type of lumber poses no risk of harm. Without wading into that debate, I will simply point out that the use of straw bales renders the question moot.

The alternatives to pressure treated lumber, such as composites and naturally rot-resistant woods, all pose their own environmental issues, not to mention their far greater cost.

WHY STRAW BALES ARE BETTER

Straw bale gardening eliminates much of the cost of using raised beds, while achieving a similar level of productivity in most cases. (There are a few exceptions, discussed in detail in the sections devoted to those crops.) Straw bales often are widely available and inexpensive, especially when compared to other growing mediums.

If you count your time as part of the investment, the cost of the constructed bed is even greater. It takes only a minute to set a few straw bales in place.

And with straw bales, you have no worries about pressure treated lumber or other such products. Mostly composed of pure cellulose, straw bales are a by-product of grain production and, therefore, completely biodegradable. Once the bale can no longer give service as a growing space, you can use the remaining compostlike material to improve soil, perhaps for the production of a perennial crop like raspberries. Using agricultural waste to grow additional food seems like the ultimate in sustainable technology.

There's no denying that straw bales can impart a rustic look to your garden. If aesthetics are a concern, you can reap the benefits of both raised beds and straw bales by constructing an enclosure to house one or more bales. Such an enclosure will most cheaply and easily be made of wood (not pressure treated), although you could use various other materials, including landscape blocks or stone.

One drawback to the enclosed bale approach is the potential for variation in the available bales from one year to the next. If you have a consistent supply of bales of known dimensions, you should have no problems with using an enclosure from season to season.

During the preparation of this book, I set up two bales in an existing cold frame. The cold frame isn't in use in the summer months, and adding the bales allowed growing more vegetables without having to cultivate the soil in the bottom of the frame, which contains heating cables for winter use. By simply filling in any gaps with loose straw or another organic material, the bales are adequately supported and protected, and the cold frame space can produce crops all year long.

Built-In Heat

Bacteria are remarkable little creatures. Without them, life for us higher organisms would be impossible. The bacteria living in our gut protect us from certain conditions and pathogens; bacteria in the soil decompose organic matter and make its constituent nutrients available to plants; and bacteria in foods make possible the creation of all sorts of goodies, from sauerkraut to cheese.

It should come as no surprise, then, that bacteria have a crucial role to play in your straw bale garden, as they do in every garden. Bacteria get the bales ready for vegetables by decomposing them, turning them into compost—a process that releases a lot of heat. The heat can be used to your advantage, especially if you're trying to stretch out your growing season.

HEAT FROM WITHIN

Because the bacterial heat is generated within the bale, it bears little relationship to the external temperature. On a frosty morning early in the season, you might see steam rising from your straw bale garden.

On the other hand, a high ambient temperature facilitates the bacterial growth. Bales conditioned during the summer months will complete the conditioning process more rapidly than bales prepared during the colder season.

FEEDING YOUR BACTERIA

Feed the bacteria living in your straw bales, and they'll eventually return the favor—with the help, of course, of the tomatoes, cucumbers, lettuce, and other plants you grow. The beneficial bacteria need only a few basic things to thrive: water, nitrogen, oxygen, and a supply of organic matter are sufficient.

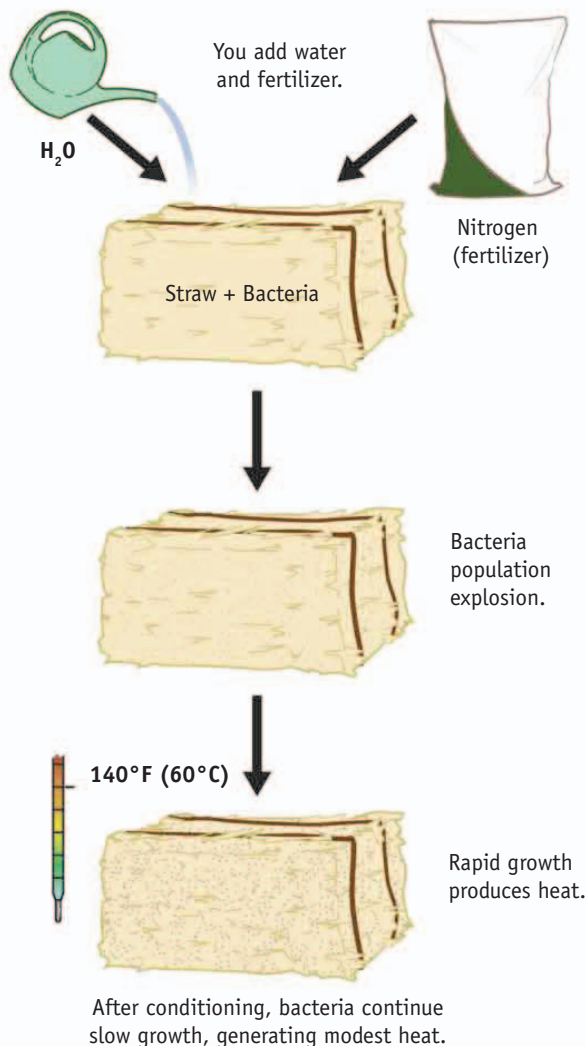
The process of conditioning the bales, discussed in detail in later sections, jump-starts the bacterial activity, much like lighting a fire with a match. Once the process is initiated, it continues on its own with little help from you.

USING THE HEAT

During the warm season, the heat generated inside a straw bale garden merely keeps the roots of your vegetables warm. At the ends of the season, however, that extra heat can get plants off to a good start, or keep them growing, a week or more beyond what could be done without the heat.

In spring, transplants of warm season vegetables, such as tomatoes and eggplant, can go into bales much earlier than they can go into the cold soil. In autumn, covering a bale planting of, say, peppers with clear plastic or a floating row cover traps the heat generated by the bale and allows for more days of harvest time and more fruit to mature.

If you want to try either of these options, plan on providing support for the coverings with, for example, a trellis or support poles.



A thermometer is indispensable for measuring the temperature of your bales during conditioning and for checking on conditions as the weather cools. Good choices include metal kitchen thermometers in the correct temperature range up to about $200^{\circ}F$ ($93.25^{\circ}C$) or any thermometer you can insert deep enough to measure the temperature inside the bale. I use a digital thermometer with an external probe.

Water Wise

Improper irrigation can be the downfall of the beginning gardener. Some plants don't like their foliage wet, for example. Most vegetables are unhappy when kept too wet, and they all resent being too dry. Errors in irrigation early in the life of the plant can reduce, or even eliminate, the harvest later. Therefore, good water management is essential for any vegetable garden.

Straw bale gardening makes this a simple task because most watering problems are eliminated when straw bales are used.

STRAW AND WATER

A dry bale of straw can absorb several gallons of water—far more than you might imagine until you try to saturate one with your garden hose.

However, once the bale has been soaked to capacity, it remains moist for days. Further, because straw is hollow and the bale is made of many stems of straw all bundled together, there's a lot of retained air space within the bale. This makes the bale well drained, yet still moist.

Gardening manuals typically describe the ideal soil for vegetables as “well drained yet moisture retentive.” This perfectly describes the growing medium produced by properly conditioned straw bales.

AUTOMATIC MOISTURE REGULATION

Within a conditioned straw bale, moisture regulation becomes automatic. When rain is falling, the bales soak up water until they're saturated. When the rain stops, the excess quickly drains away to the surrounding soil, leaving the bale just moist enough to nurture plant roots. Unless you were to leave the hose on continuously, it's virtually impossible to overwater a straw bale garden.

Underwatering might occur if you are away and the weather becomes extremely hot and dry. Obviously, if the bales dry out sufficiently, you'll have problems. You can easily manage this, however, by using a water timer and a soaker hose to deliver water to your bales on a regular basis. Going away on vacation, for example, would pose no problem for the garden as long as your timer is working properly. Should it rain in your absence, the extra water won't oversaturate the roots and cause them to rot. If they were in soil, however, this might not be the case.



WATER CONSERVATION

What's more, using straw bales helps conserve water. In areas where water is scarce and expensive, this can be a significant advantage.

Water need only be applied to your straw bales in small amounts, once they're conditioned and saturated, to keep them appropriately moist. As you work with your straw bale garden, you'll be able to develop the appropriate watering schedule that works without wasting water.

When in doubt, and if water is not too expensive where you live, water each bale thoroughly for a few minutes each day and skip it when the rains come.

Even More Benefits

We've looked at many advantages of straw bale gardening already, but we're not done yet.



NO CROP ROTATION NECESSARY

One of the chief concerns of vegetable growers is the necessity for crop rotation. Different plant species place differing demands on the soil. Corn, for example, requires rich soil with abundant nitrogen, while beets need very little nitrogen but lots of phosphorus. When the same crop is grown year after year in the same spot, the soil becomes depleted of the nutrients that particular crop extracts, and the result is a smaller harvest with each subsequent season.

Another important reason for crop rotation is the sharing of diseases among the various members of a given family of plants. For example, tomatoes, potatoes, eggplant, and peppers are all in the same family. We'll call it the "tomato family." Various viruses and blights affect all members of this group, and in some cases even members of the closely related group to which strawberries belong. As a result, if tomatoes are grown in the same soil that has just yielded a crop of potatoes, the chance for disease increases significantly.

Cucurbits, including squashes, cucumbers, and melons, are also subject to many soil-borne diseases and must be grown in soil that has not previously held a member of the same family. Like members of the tomato clan, however, these are some of the most desirable and productive crops for a backyard garden and it's a shame to do without them during any given year.

Gardeners are generally advised to avoid planting members of the same family in the same spot for 5 years, and in one of those 5, the space should be allowed to lie fallow, or empty, or be sown with a cover crop. When space for the garden is at a premium, this becomes an ever greater challenge.

The straw bale gardener avoids having to learn all about plant families and nutrient requirements, and instead can focus on caring for his or her crops, all due to the growing medium. Because each season begins anew with a fresh batch of bales, no opportunity for nutrient depletion or the establishment of disease organisms occurs.

In fact, the straw bale garden eliminates all but the rudiments of garden planning, because it's no longer necessary to remember what you grew where season after season. You just plant what you want where you think it will grow best—it's that simple. Whereas a gardener using raised beds or containers may have to toss out large amounts of spent growing medium, replacing it at no small expense, the straw bale gardener merely shells out a few dollars for another bale, and the gardening continues.

Another reason this works so well with straw bales lies in the conditioning process. Any disease organisms that might have been present in the straw to begin with are destroyed as the internal temperature of the bales reaches 140°F (60°C) during conditioning. Therefore, plant roots are immersed in a pile of nitrogen-rich, essentially pasteurized, compost.

NO MORE WEEDING

Weeding is a chore many gardeners lament. Tenacious, adaptable plants, weeds—a surprising number of which are escapees from cultivation—seem to appear from nowhere in spots where they're not welcome, like your garden. The characteristics that make weeds so successful, ecologically speaking, also render them difficult to eradicate. Rather than fight this battle, the straw bale gardener takes another tack: avoid weeds altogether.

Straw comes from wheat, a seed. The farmer and his combine remove and save nearly every grain, so straw rarely contains wheat seeds. If any do sprout, they are weaklings, accustomed to the coddling they often receive out in the field, and easily removed and destroyed.

It's also in the farmer's interest that his fields not contain foreign plants, whose seeds might contaminate the wheat harvest, and whose stems and branches adulterate the straw bales. By and large, though, straw bales don't contain either weeds or weed seeds.

Seeds of all kinds of plants can arrive in your garden courtesy of wind, flowing water, and birds. Any patch of ground will be continually bombarded by this natural movement of seeds, and there will be far more seeds lying dormant below the surface of the soil than there are growing plants reaching for the sun above it. This can be easily demonstrated, as Charles Darwin once did, by removing a small amount of garden loam to a container and counting the number and variety of seedlings that sprout from it.

When any patch of soil enters cultivation, therefore, it's typically preseeded with all manner of plants, native and exotic. For the most part, these seeds remain dormant because they require light to germinate. When brought to the surface by the tines of a tiller or the blade of a hoe, they germinate, and your perfectly cultivated vegetable patch becomes a patchwork of annual weeds, seemingly overnight. Growing in straw bales completely avoids this problem, as no digging is involved from the outset.

How can weeds reach your straw bale garden? Via birds, wind, and sometimes in the pot a vegetable plant came in, but that's about it. Each of these events is rare, and certainly random. The likelihood of birds roosting over your bales must be small, and wind-deposited seeds are no more likely to land on a bale than on the remaining, comparatively vast, area of your yard.

Those random seeds that do hit the straw may simply be washed into its depths by watering, never to be seen again. And any weeds that do manage to reach your straw bale garden, lodge securely, and germinate will be easy to spot. You can remove them with a slight tug, thanks to the texture of the conditioned bales.

The greatest likelihood, however, is that no weeds will appear in the first place. My straw bale garden is surrounded by all sorts of plants, including weeds here and there, and I have yet to discover a weed lurking among my vegetables.

When you're selecting bales for your straw bale garden, avoid any bales that contain any visible sections of nonstraw material.





FEWER DISEASES AND PESTS

One of the chief problems with some plants is disease that results from soil-borne fungi. Tomatoes, eggplants, and cucumbers are among the more common examples of such disease-prone plants. While fungal spores can be transported long distances by the wind, the most common route for these plants to become infected is via soil splashing up on their leaves. When grown in straw bales, there's no reservoir of fungal spores lying just beneath the tender leaves, waiting to spring to life as a case of mildew or blight.

Among the most dreaded of garden pests, slugs and snails are cursed by gardeners anywhere they occur, as they do significant damage to all types of ornamental and edible crops. You can trap, deter, and poison slugs and snails in numerous ways, but straw bale gardens just don't seem to attract them.

Because they travel along on a trail of slimy mucus, the pesky mollusks leave behind evidence of their nightly forays (in addition to the damaged plants they leave in their wake). These glistening slime trails are evident in the morning sun. So far, in my straw bale garden, I have yet to notice any slime trails. Apparently the snails and slugs just don't like to climb straw bales when other, ground-level fare is nearby.

Growing a straw bale garden won't magically free your vegetables from the depredations of all pests. Flying insects, from bean beetles to squash vine borers, will still seek out your crops. Nevertheless, some crops thrive so well in bales they don't become stressed. Stressed plants act as beacons for predatory insects, which are somehow alerted that the plant's defenses are weakened.

CLEAN HARVEST

Anyone who has ever found an insect in his or her salad will appreciate the importance of washing fresh produce as soon as possible after the harvest.

When vegetables are grown in the ground, they're intimately in contact with the soil, along with various creatures from beetles to slugs that either prey on the plants, dwell among their leaves, or both. Straw bale gardening offers numerous advantages when it comes to avoiding pests and lessening the time required to prepare vegetables for storage or cooking.

Vegetables that bear fruits, such as tomatoes and cucumbers, remain remarkably clean in a straw bale garden. The slight elevation above grade means they never even get splashed with mud when it rains. You can pick and eat them right on the spot, if you want.

In addition, root crops, such as beets and onions, come free of the bale without much debris clinging to them, making them much easier to clean for storage or cooking.

And you can harvest leafy greens, such as lettuce, easily and with hardly a speck of dirt on them. They require only a quick rinse to prepare them for a fresh summer salad.

High-Quality Compost

All that's left of a bale at the end of the straw bale garden season is composted straw. You don't have to read many gardening books to learn how much expert gardeners value compost as a soil amendment. Amending the soil changes its condition, hopefully for the better. When your straw bale garden has given up its last harvest, what remains behind is a rich and nourishing compost you can use elsewhere.



HOW COMPOSTING WORKS

Organisms in the soil decompose organic matter. Leaves, tree branches, dead squirrels, bird droppings, and anything else organic eventually returns to its primary constituents through the actions of insects, small invertebrates, fungi, and ultimately, bacteria. The process liberates the nutrients stored in the body of the squirrel or the leaves, making them available once again for plant growth and closing the cycles of nutrient flow that make all life on Earth possible.

A straw bale is primarily composed of cellulose, a lot of carbon with much smaller amounts of other materials. Therefore, to get the composting process started requires more than just the straw itself. If you were making compost in a bin, you'd want to add both "brown" (high carbon) organic matter, such as leaves, and "green" (high nitrogen) organic matter, such as fresh vegetable clippings or rabbit manure. When these components are mixed together and moisture is added, the fungi, bacteria, and other organisms begin to multiply and the process of decomposition takes off.

The furious bacterial activity consumes oxygen, liberates carbon dioxide, and generates a lot of heat. In fact, compost can easily get hot enough to give you a first-degree burn! The heating has the advantage of killing weed seeds and insect eggs that may be hiding among the plant matter being composted.

STRAW BALE CONDITIONING

To simplify the composting process and get bales ready for a straw bale garden—a technique known as “conditioning” the bales—you jump-start the bacterial activity with a massive input of nitrogen and then monitor the internal temperature of the bales.

As a general rule, you add about 5 ounces (141.75g) of nitrogen (a component of commercially available solid or liquid fertilizers) per bale for a standard-size bale during the course of the conditioning process. It makes no difference in what form the nitrogen is added, as long as the total amount is approximately 5 ounces (141.75g) per standard-size bale. For example, 1 cup of 10-10-10 granular fertilizer weighs about 6 ounces (170g). Therefore, 10 percent of the weight, or .6 ounces (17g) is nitrogen. The three numbers that appear on every fertilizer bag represent the percentages by weight of nitrogen, phosphorus, and potassium, respectively, delivered by the product. So you’d need a bit less than 9 cups of 10-10-10 to supply sufficient nitrogen to condition a bale.

If, on the other hand, you were to use urea, which is 42 percent nitrogen, you need much less, by a factor of 7. If you always base your calculations on the amount of nitrogen added per bale, and keep that at about 5 or 6 ounces (141.75 to 170g) total, all will be well.

AT SEASON’S END

At the end of the season, you can distribute the composted bales around your garden, on your lawn, or in your flower beds. Use it to mulch trees and shrubs, or add it to an area of soil that has too much clay and work it in to enrich the soil.

You also can construct a simple “holding pen” to keep your supply of compost ready until you need it. Made of wood, wire netting, or any number of materials, this structure can be in any configuration that keeps your composted bales confined and permits air circulation, which keeps the composting process going at a low level.





SECTION 2

Creating Your Straw Bale Garden

Gardening in straw bales is much like gardening in soil, only easier. Plants will nevertheless require regular watering, inspection for pests, and the imposition of pest control measures where necessary. You need to be familiar with seeds and transplants, just as does the soil-bound gardener. Your straw bale garden will be most rewarding if you create and follow a garden plan.

This section begins with advice on selecting the best straw bales for gardening purposes and moves on to the important topic of planning. As with any garden project, straw bale gardens should be “planted” on paper before the actual plants go in. The following sections provide several suggested garden layouts for a variety of household needs. Each of the techniques and procedures, from choosing and using tools to conditioning bales to planting seeds, is covered in detail, with step-by-step instructions where important.



The Straw Bale

As a kid growing up on a small family farm, I was always fascinated by the mechanical hay baler. As I watched, windrows of loose hay were swept up as the machine rolled over them, and after a series of operations hidden beneath the baler's housing, out popped a rectangular bale of hay. (Today's wheat combines incorporate a baler that works the same way.)

You might be tempted to think that a bale of straw is a bale of straw, but in fact, thanks to various design features of farm machinery, bales come in considerable variety. All balers work basically the same way, but each brand varies slightly in the size of the bale, and whether it is tied “around” or “across” with twine.

In addition to these built-in variations, balers have adjustments that allow the farmer to select a tightly packed, heavy bale or a looser, lighter one. Each of these variables affects the characteristics of the bale, and those, in turn, are of interest to the straw bale gardener.

STRAW VERSUS HAY

Before we talk more about bales, let's take a quick look at what makes up those bales—the straw. Straw is comprised of the stems, leaves, and empty seedheads of cereal grains, wheat, oats, barley, or rye. Straw is not the same thing as hay, however. Hay is the stems, leaves, and empty seedheads of grasses other than cereals and can include additional plants, such as the legume alfalfa. When used as a growing medium, hay may not give the same results as straw.

Legume hays are especially rich in nitrogen and may compost too quickly to allow growing plants to mature. The bales must be partially composted, a process known as “conditioning,” before they can be used to grow vegetables. This process is jump-started by adding a large dose of nitrogen to the bale, which causes decomposing bacteria to undergo a population explosion. If the medium is already rich in nitrogen, as is the case with legume hay, at the very least, you'd have to adjust the amount of added nitrogen to yield satisfactory results.

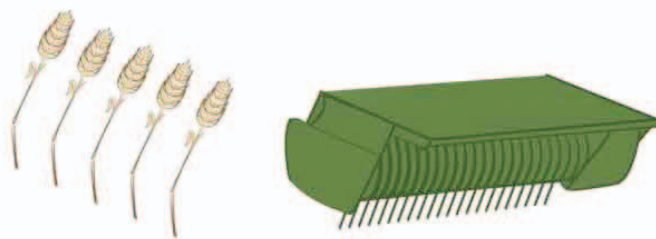


FROM WHEAT TO BALE

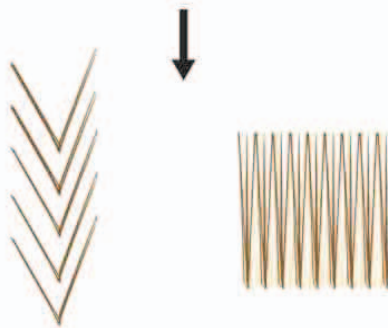
You might be wondering how the straw is made into a bale. Time for some bale anatomy.

Wheat grows upright. When it's cut, it's scooped up by the combine with all the stems lying in the same direction. This orientation remains after the grain is flailed out, and when the straw is baled, the stems are folded in half, forming a thick mat of multiple sheaves of straw about 2 feet (.5m) square and 4 inches (10cm) thick. This mat has two distinct ends, one with the cut ends of the straw and the other with the folded stems. These represent the “top” and “bottom” of the mat, respectively. In the next steps, the baler packs several mats together and binds them together with twine to create the bale. Depending on the baler, the bale of straw may be bound around the sides of the mats or across their tops and bottoms.

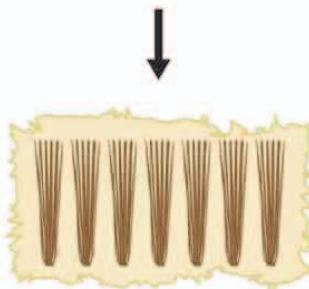
The two arrangements work equally well for the straw bale garden, but if you have a choice, choose bales tied around the sides, leaving a “top” with the cut ends of the straw and a “bottom” consisting of the folded straw. As you'll learn, the bales will be positioned with the cut ends pointing up for your straw bale garden. This is why I refer to this side as the top of the bale. If the twine runs across the top, it may be in your way when working in the garden. This isn't a problem for the plants, but you want to avoid cutting or breaking the twine, so it's better if bales are tied around their sides.



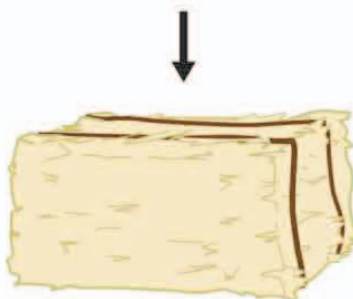
Wheat is cut and scooped up by the baler.



Inside the baler, the wheat is folded in half to make sheaves.



The folded sheaves are packed to form a bale.



The bale is tied and ejected from the baler.

DENSITY IS IMPORTANT

As mentioned earlier, the packing density of a bale can be adjusted to produce a bale weighing roughly 30 to 60 pounds (13.5 to 27.25kg). For the straw bale garden, choose heavy, tightly packed bales when possible. The more tightly the bale is packed, the longer it will last in your garden without collapsing. A 60-pound (27.25kg) bale of straw is a rarity, but the heavier the better. Heavy bales contain more dry matter and, therefore, take longer to decompose.

Beware of bales that are green or damp. They'll be heavy, but this is due to the extra moisture they contain. Such bales will decompose very quickly and may not even survive the full season.

Ideally, purchase bales during late winter, when the available straw will have been stored in a warehouse since the fall harvest, ensuring it's thoroughly dry.

FINDING BALES

Straw bales are available from big-box hardware and do-it-yourself stores, landscaper supply companies, and directly from farmers in some communities. With diligent effort, you might even be able to find organically grown straw bales.

When shopping for your bales, seek out a source that provides bales of consistent quality. Big-box stores obtain straw from multiple sources, so one truckload may not be the same as the next one. If your only source of supply is a big-box store, try to purchase all the bales you need at once. This way, they'll all be from the same truckload and consistent in their various qualities. Inspect bales carefully, check their density, and reject any that contain a significant amount of foreign matter, such as the stalks of large weeds. This material does not decompose as quickly as the straw and is reducing the useful weight of straw in the bale.

In addition to providing an ideal growing medium for your straw bale garden, bales of straw are used in many other applications, landscaping and grounds management chief among them. Golf courses, public parks, and private lawns all need restoration and reseeding from time to time, and straw is the cheapest and most universally available mulch for protecting newly seeded lawns. Because straw used for this purpose is typically hand scattered by laborers, there's continuing demand for straw bales small enough to be managed by one person.

Helpful Tools

In addition to the straw bales in which you'll grow your plants, it's handy to have a few basic tools in your gardening kit. Fortunately for the straw bale gardener, fewer tools are required than if your garden was to be grown in the ground.

The most useful tool in your gardener's kit is likely to be a simple hand spade, or trowel. You'll use it to plant transplants into the straw bales and spread soil-less growing mix when planting seeds in your bales.



A pair of pruning shears or sturdy garden scissors can come in handy when working with tomatoes or unruly squash vines.



If you'll be using galvanized wire when constructing a trellis, get a pair of lineman's pliers.



A post driver or pounder (pictured) is helpful for installing steel T-posts as trellis supports, as is a post hole digger for wooden posts.



Purchase a couple pairs of garden gloves, too. Working with bales can leave your hands scratched and sore, and you'll definitely want gloves if you install galvanized wire on your trellis supports.





A small wheelbarrow makes moving bales, soil, tools, and produce a lot simpler, especially if the distance from the driveway to your garden is more than a few feet. If you don't want to invest in a wheelbarrow, a small reinforced plastic tarp can be a useful stand-in.



You'll also need a few accessories for garden maintenance. For pest control, a hand sprayer or tank sprayer is recommended.



You also might want a crop duster for pest control. In a pinch, a spray bottle that came filled with household cleaner can be rinsed well and used to apply liquid sprays to your plants.



Finally, a leaf rake makes cleaning up garden debris easy. You can use it to keep the mulch looking tidy, too. And a few plastic buckets come in handy for all sorts of garden chores, especially the fun one: picking veggies.

Preparing Your Site



Before you set up your straw bale garden, you should get the site ready. Proper site preparation eliminates extra work later and makes your garden look its best.

You want a more or less level spot, if possible, and a supply of water nearby. In addition, the area should receive full sun for at least 6 hours a day.

ELIMINATING EXISTING VEGETATION

Once you've selected a spot, it's helpful to eliminate the existing groundcover. In some situations, as perhaps with a rental property, this might not be possible. But if you can take this step, it'll save you a lot of work later.

If the area you've chosen is lawn or a meadowlike mixture of taller grasses and weeds, the first step is to mow. Then, gather all the clippings using a rake or the bagging attachment for the mower, and place them in your compost area.

Next, line the area with a covering that's impenetrable yet still allows for water to seep through, to create a barrier that prevents the return of grass and weeds. Possible choices include layers of cardboard, multiple layers of newspaper, carpet, or best of all, landscape fabric made specifically for this purpose. Do not use plastic sheeting. It holds water, creating puddles, and can be dangerously slippery.



Snails and slugs sometimes infest mulches consisting of wood or bark chips, using the mulch as a cool hiding place to escape the heat of day. If you notice an abundance of snails and slugs in your garden, take immediate action. Loose straw is less attractive to these pesky mollusks, or you can keep the wood and follow some of the control advice given later.

If you use landscape fabric, hold it in place with metal pins. These are usually sold alongside the fabric. Carpet is heavy enough to remain in place without pinning, unless your garden is on a slope, and you can keep cardboard and newspaper from shifting by wetting it thoroughly with the garden hose.

Now you can start adding your bales.

ADDING MULCH

The final step in site preparation actually comes after the bales are in place, when you cover the paths around and between the bales with a layer of mulch. Mulch not only makes your garden look nicer, but also keeps trailing vegetables from getting muddy if they reach ground level. It keeps you from getting muddy, too!

Mulch also develops its own little microenvironment, and makes a nice home for small insects and invertebrates that might help with pollination or pest control.

You can use any material you like for mulch. Some good choices are wood or bark chips, shredded hardwood bark, or loose straw. You could use gravel or pebbles, but these are more appropriate for more permanent gardens. In the hot, humid summers where I live, we generally prefer chips of cedar or cypress, which are rot resistant and widely available. Avoid pine needles, which tend to become slippery.

Planning Your Straw Bale Garden

Before the weather even thaws out in spring, you should have an idea how your straw bale garden will look when it's time to create it. Not only will the vision of late spring abundance inspire you to get the garden going; having a plan on paper, on your hard drive, or in the cloud will save you time and help you avoid mistakes later. As you plan, ask yourself some questions.



WHAT TO GROW?

The best way to decide what to grow is to ask your family. Get everyone together, and let each person choose one or two vegetables they would enjoy having in the garden.

Parents, note that kids who participate in the garden from this stage to harvest learn to eat and enjoy vegetables quicker than children who lack the growing experience!

From your family meeting, create a list of the crops you'll grow. Divide your list into cool season and warm season varieties. (More on the seasons coming up in a later section.) In milder areas of the temperate zone, cool season crops planted in spring can be followed with warm season crops in summer. Your latitude determines what works best in your area. Planting times for your straw bale garden generally follows local practice, although bales can usually be planted up to 2 weeks earlier than in-ground gardens.

HOW MANY BALES?

With your list of crops in hand, decide how many bales you'll need to grow the crops, again relying on the numbers suggested elsewhere in this book for individual crops. If you intend on succession planting—that is, following spring lettuce, say, with summer peppers—one bale can do double duty during a single season.

Arrange the vegetables in your list in two columns, corresponding to the cool season and warm season. You may quickly see which can follow which.

WHAT'S YOUR SCHEDULE?

All that remains is to add projected planting and harvest dates. To determine these, consider both the average date of last frost in your region, and the days to maturity printed on the seed packet or plant label of the varieties you're considering. The latter information depends on the specific cultivar you intend to grow and can vary considerably from one cultivar to another. Days to maturity given in this book are averages for the species. In some cases, I specify a range of maturity dates that approximates the range of available cultivars.

When reporting days to maturity, seed companies reference the number of days from germination. Germination time for a particular plant variety can vary as much as 2 weeks, depending on, for example, the temperature at which germination is carried out. Seeds planted in cool weather take longer to germinate than those planted when the weather is warm. Germination time also varies from one species to another, so you can't expect several crops planted at the same time to germinate at the same time, even though they're right next to each other in the garden.

It's not really necessary to calculate the time your plants will spend in the garden down to the day. Some variation always occurs. An unexpected late cold snap can set everything back a week, or an early thaw can speed things up. Still, you want to have a rough idea of what to plant when.

SEED OR TRANSPLANT?

If you're new to gardening, I recommend you start as few vegetables as possible directly from seed and instead purchase young plants you can transplant into your straw bale garden. This vastly increases the likelihood of success over direct seeding.

That said, I provide instructions for both sowing seed and starting transplants in this book. Vegetables most commonly started by direct seeding are beans, beets, carrots, corn, okra, leafy greens, and peas. Most other vegetables can be grown from transplants.

Understanding Warm and Cool Seasons

In most parts of the world, seasons define the periods of warm weather versus cool and cold weather. Plants do better, in general, in warm weather, but thanks to straw bale gardening, you can stagger what you plant for an expanded growing season.



THE WARM SEASON

Warm season crops are those that require the soil temperature to be above 60°F (15.5°C) for proper growth. With a few exceptions, these crops are typically started in a greenhouse and moved to the garden as small transplants.

Some warm season veggies tolerate cool temperatures better than others. Tomatoes, for example, don't mind a brief period of unanticipated cold, but okra and eggplant may be permanently set back if they're exposed to cold sufficient to halt their growth early in the life cycle.

Because straw bale gardens produce their own heat, you can transplant or sow warm season crops in your straw bales about 2 weeks earlier than the typical planting date for your region. Barring unexpected weather, this means you'll have an earlier harvest and perhaps the opportunity to produce a second crop before the end of the season. If room permits, you should stagger the conditioning of your bales to allow for succession planting. That way, you won't be overwhelmed when everything matures at the same time.

THE COOL SEASON

The “cool season” is, in general, the time of year during which the daytime high doesn’t exceed 70°F (21°C) and the overnight low doesn’t dip below freezing. In some locations, this is during the summer, meaning you can plant cool season crops alongside more heat-loving ones. In milder climates, the cool gardening season occurs twice a year, in both spring and fall. In subtropical areas, the cool season is typically winter.

The straw bale gardening method allows you to grow cool season crops earlier in spring and later in fall than you could in the ground. Nevertheless, the time of year when you can grow cool season crops to perfection depends more on your location than any other factor.

Generally speaking, you can follow cool season crops with a warm season crop in the same bale. Strawberries and potatoes are the exceptions. The former must be left in place from spring through the season, and harvesting the latter leaves the bales in tatters. But you can follow spinach with a crop of green beans, lettuce with tomatoes, and leeks with okra, along with numerous other possible succession crops.

Gardeners who live where summers remain cool can also grow warm season crops if the nighttime temperature is at least 55°F (12.75°C) for a sufficient number of days.

If you plan to grow a straw bale garden next spring, be sure you start early and get your bales conditioned. Conditioning is temperature dependent until it gets going, and late winter cold may extend the conditioning time by a few days. Plan ahead to make the most of the spring gardening season in your area.

Straw bales break down faster in warm climates than in cool ones. If summers are hot where you live, be sure to choose heavy, well-packed, and very dry bales that are the least likely to decompose and collapse before you want them to, possibly threatening the survival of your crop.

Designing Your Garden

When you plant an in-ground garden, it's easy to think about what you want to plant; buy your seeds and seedlings; and then plant your vegetables, fruits, and herbs in neat and tidy rows in your garden.

But with the three-dimensional quality of straw bale gardens, you have more options for plant arrangement. And that, although an opportunity, can also be a challenge. What do you plant where in the bale, and with what other plants?

GARDEN LAYOUTS

To make learning the straw bale method as easy as possible, I've created some potential garden layouts you can use when designing your own straw bale garden. Each design on the following pages has a different theme, and each is presented in two panels—one for the cool season and one for the warm season.

For clarity, I have not shown plants placed between bales or on the ends or sides. Instead, I've included suggestions for what you can plant in these locations as part of the discussion about each layout.

Use these layouts as guidelines, following them exactly, if you want. Or treat them as suggestions and substitute other plants if you prefer. The choice is yours.

A NOTE ABOUT SEASONS

Gardeners in areas with a long, mild growing season can grow cool season crops in both spring and fall, and gardeners in most latitudes should be able to grow all the warm season crops.

Cooler regions with a short growing season may not be able to produce okra or melons. These tropical plants require heat over the entire course of their development to thrive.



LAYOUT 1: BEGINNER VEGETABLE GARDEN

The primary goal of this design is to include the easiest and most rewarding vegetables for a beginner to grow. Utilizing only four bales, this garden starts vegetables that are at their best when consumed fresh. Feel free to can or freeze your harvest if you like, but be sure to savor at least a few fresh vegetables directly from the bale.

For this design, I recommend you construct a trellis across the two middle bales only. This requires minimal materials, and the arrangement makes the garden look symmetrical.

In the cool season layout, you can train the peas in bale 2 to grow horizontally above the miscellaneous greens in bale 3 if the vines become sufficiently vigorous. This depends mostly on the pea cultivar you select. Snap peas especially can become large.

It's not necessary to plant your entire garden at once. You can plant the lettuce, scallions, miscellaneous greens, and spinach in small blocks, allowing for succession planting and, therefore, a continuous supply of greens.

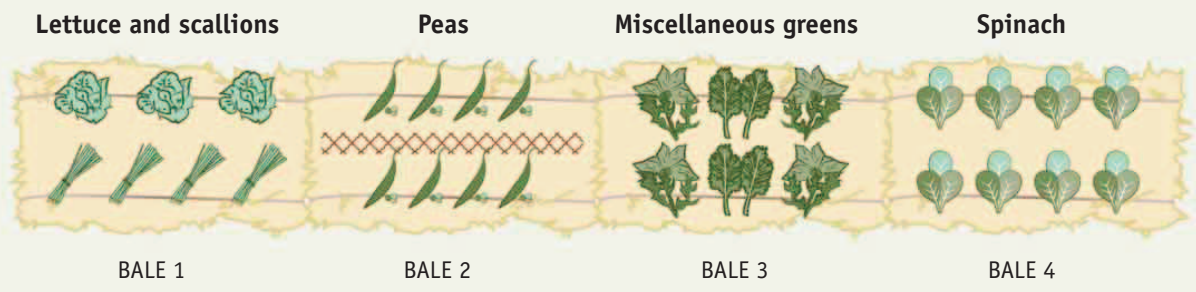
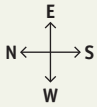
The warm season garden utilizes the central trellis for two indeterminate cherry tomato plants and two hills of cucumbers. Two zucchini plants fill bale 1 and will probably spill over the ends and sides. On the opposite end, with the peppers and bush beans, you can add any of the summer herbs or edible flowers in the end and sides of the bales. You could also plant basil and dill on the sides of the middle bales. Dill goes well with cucumbers, and basil enhances the flavor of tomatoes grown nearby.

Plant two pepper plants in the middle of bale 4. You then should have enough space on either side for bush beans. Plant one side, and wait until those beans bloom before planting the other side. By the time the first batch of beans is exhausted, the second batch should be forming beans. If your growing season is long enough, you can alternate from side to side two or three times.

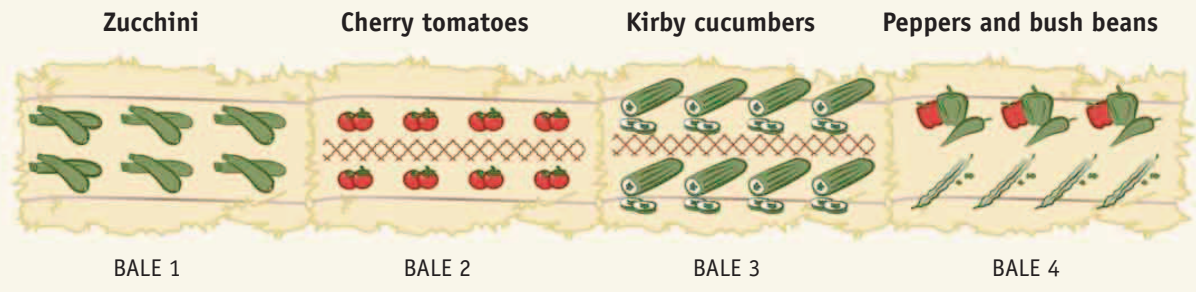


Each layout assumes that at least a portion of your straw bale garden contains a suitable trellis. Growing vertically is one of the best ways to increase productivity in a limited space, and I urge you to use a T-post and wire trellis arrangement to give your plants a foundation upon which to grow. This type of trellis is simple to install and sturdy. Look for this illustration to learn what to plant with a trellis.

Cool Season: Salad Garden with Peas



Warm Season: Easiest Summer Garden Crops



LAYOUT 2: GOURMET HERB AND VEGETABLE GARDEN

The second layout expands to eight bales to give you room to include some vegetables that require more space.

The first group of four bales has a trellis only in the middle, while the second group has a trellis running all the way across. Because peas are the only early crop that requires a trellis, you could substitute peas for any of the cabbage family in the cool season layout.

Plant the root crops, radishes and carrots, together in bale 4. Mix the seeds in a ratio of about one part radish to three parts carrots, lay out furrows in the soil-less growing mix 2 inches (5cm) apart, and sow the seed mixture in the furrows. Cover lightly with growing mix, press down gently, and water well. The radishes will germinate first. Thin them before true leaves appear. This will help loosen the growing medium for the carrots, which will begin to emerge as the radishes are maturing. Harvesting the radishes will thin the carrot seedlings.

Plant herbs and greens in the end bales of the second group, with two or three broccoli plants and four to six cabbage plants in the middle bales. (The number of plants you can fit in depends on the mature size of the variety you choose.) Kale, kohlrabi, and cauliflower are the best substitutes. Collards and brussels sprouts are also possible, but they do better if planted in late summer to mature in fall.

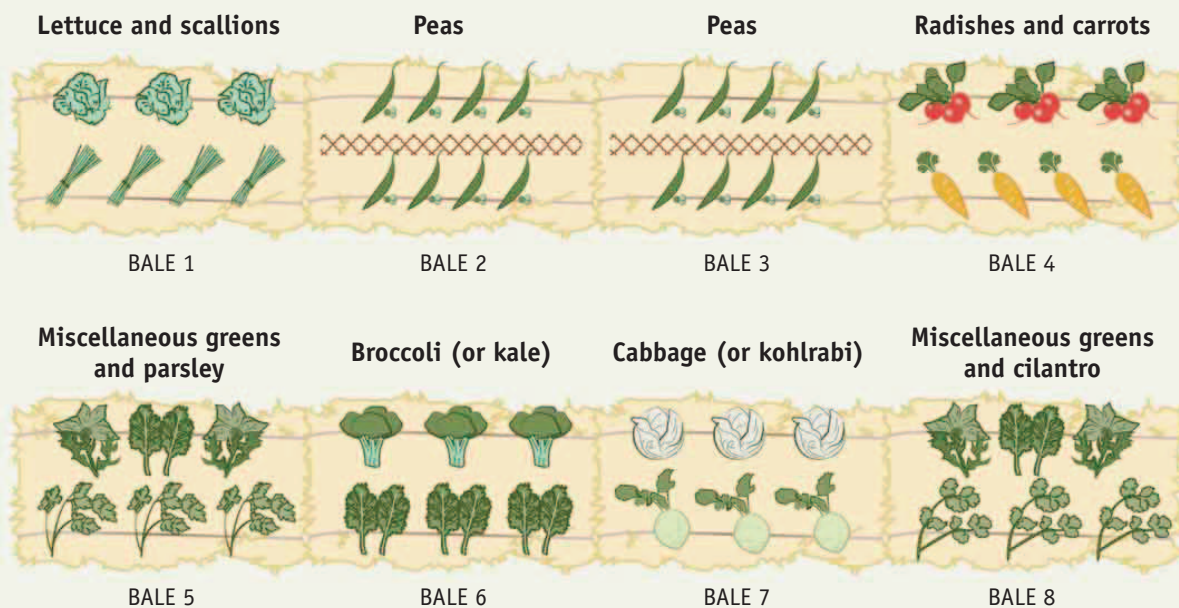
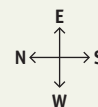
Heirloom and/or hybrid tomatoes take over the trellis in bales 2 and 3 for the summer months. Peppers, which take over after the lettuce is done, are a good companion for parsley and basil plants. The latter can go into the sides or ends of the bales, too, if you want additional plants. Beets make their appearance in this layout, with dill and cilantro. Plant the beets alongside the carrots about 2 weeks before you expect to harvest the latter.

Cherry tomatoes, cucumbers, pole beans, and melons take over the trellised bales after the spring greens and cabbage are done. You could substitute winter squash for any one of these, or grow more heirloom tomatoes instead of cherry tomatoes.

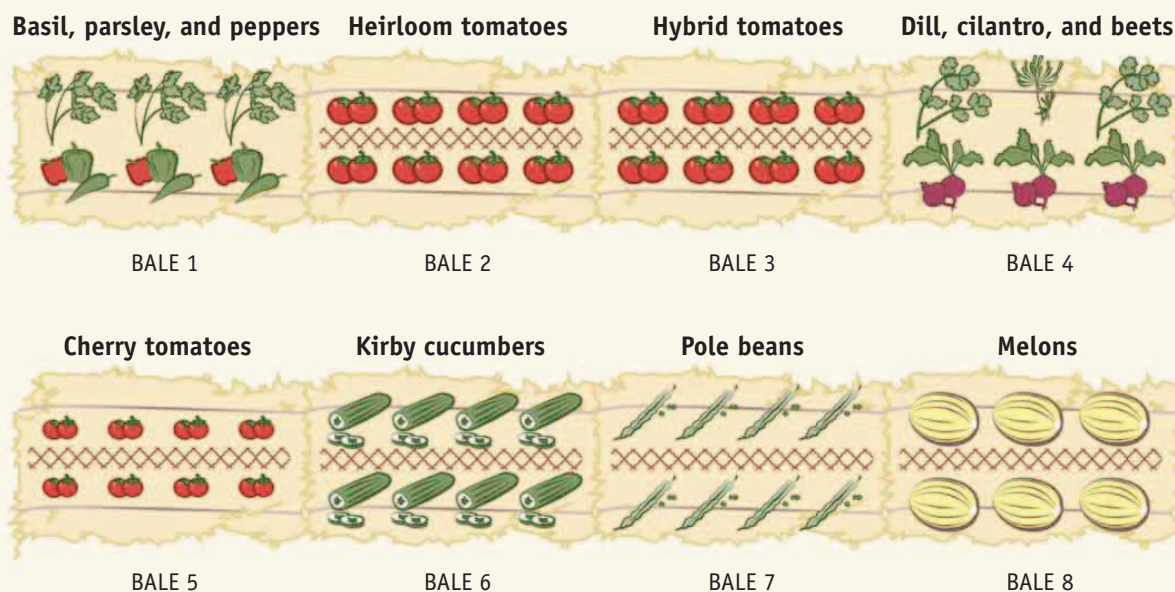
Tuck edible flowers, additional herbs, and even heat-tolerant lettuces on the sides or ends of the bales. Or leave the parsley and cilantro planted during the cool season in place in the warm season. They should continue to bear leaves until heat forces them to bloom.

Cabbage family members, or “brassicas,” are often a target of the cabbage butterfly, *Pieris rapae*. Utilizing a trellis enables you to cover the second group of bales with floating row cover to exclude insects, if insect pests lurk in your region.

Cool Season: Gourmet Herb and Salad Garden



Warm Season: Gourmet Summer Herb and Vegetable Garden



LAYOUT 3: HARVEST AND PRESERVATION GARDEN

If you're interested in preserving much of your harvest for later use, this is the garden design for you, as it features vegetables that are easy to can, freeze, or pickle.

The spring garden is all about frozen foods and sauerkraut, with a bit of salad thrown in for good measure. Two bales each are devoted to spinach, peas, and cabbage. Try shelling peas, which retain quality better when frozen than either snow or snap peas. Harvest young spinach leaves and incorporate them into a spring salad along with the lettuce, scallions, and parsley from bale 4. Or allow spinach to mature and freeze your crop. Select an early cabbage variety for small, dense heads, ideal for sauerkraut, less than 3 months after you transplant them to the bales. Or grow broccoli or cauliflower in these bales instead. Both retain excellent quality when frozen.

In the summer garden, hybrid tomatoes are the star. Choose a hybrid specifically developed for home gardens, and you'll be rewarded with abundant, uniform fruits perfect for canning or juicing.

The pole beans can be preserved by any of several methods, including canning, freezing, and pickling. Because the beans will bear steadily over a long season, you can try all three methods if you have the equipment.

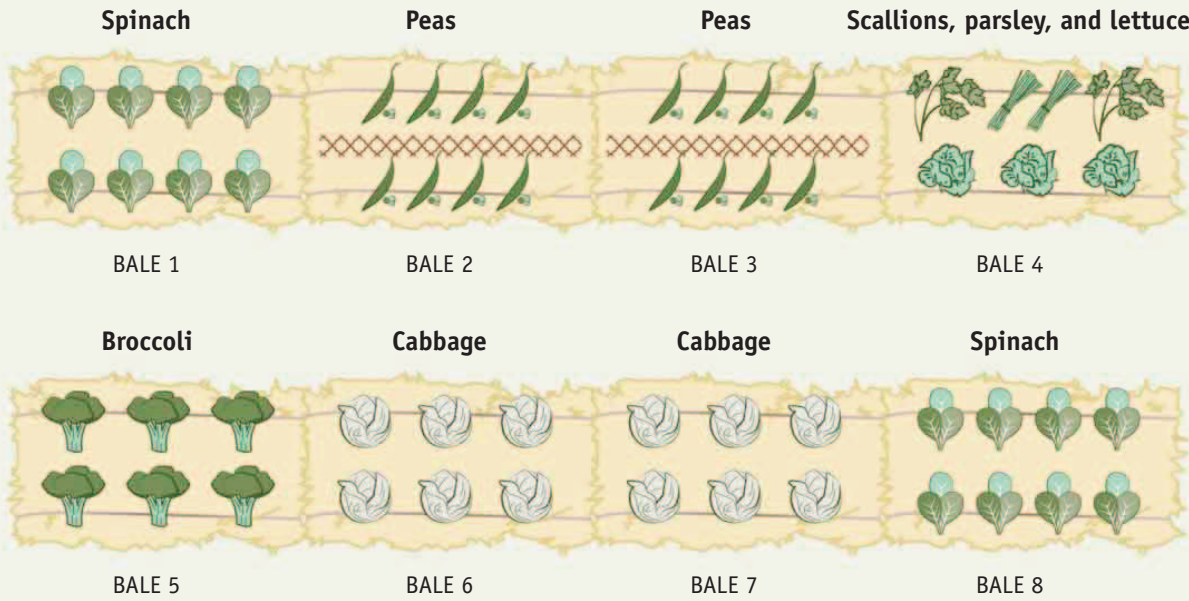
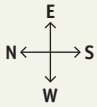
The beets recommended for summer cropping may be canned or made into pickles. The Kirby cucumbers make nice pickles, too. Small quantities of pickles, regardless of the vegetable involved, can be stored in the refrigerator for 3 months.

The winter squash will keep for 6 months if well grown and harvested at full maturity. You could substitute a melon for the squash, if you prefer, although the fruits must be eaten while fresh and only keep a few weeks, at most, after picking.

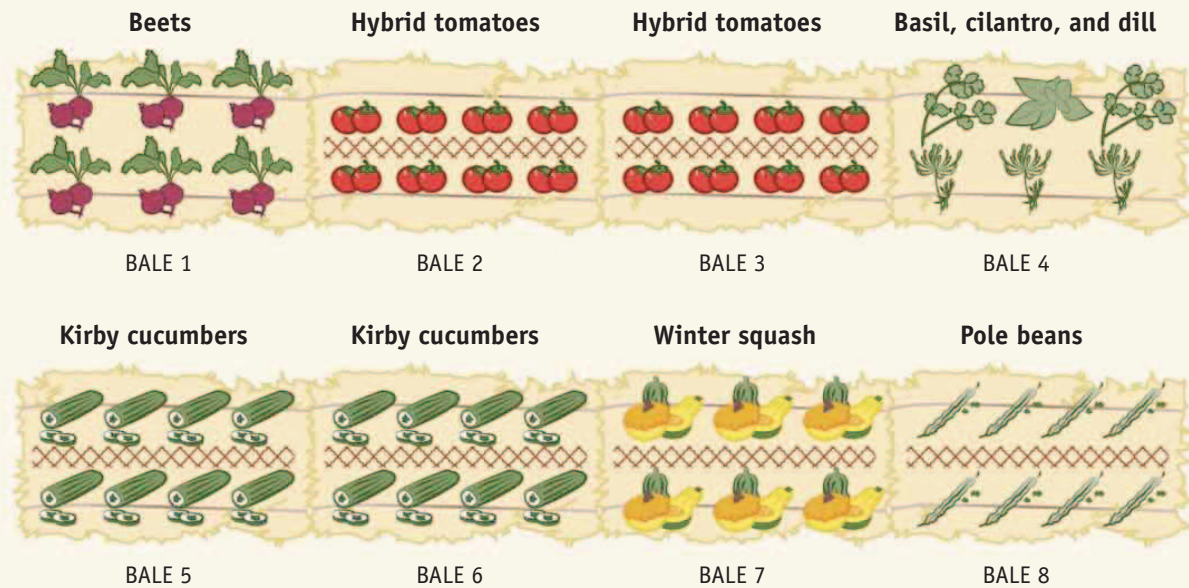
Dill, cilantro, and basil are recommended to follow the spring salad crops in bale 4. Use dill to season pickles, and add basil and cilantro to canned tomato products. Or plant the herbs on the sides or ends of the bales and use the space for another crop. A bale of okra, for example, might make sense, and is in keeping with the theme of the garden. Okra freezes easily and can also be made into pickles.

Always follow a published recipe when preserving food at home. An excellent resource is the National Center for Home Food Preservation. Its website, nchfp.uga.edu, offers food safety information and recipes for many different types of preserved foods.

Cool Season: Focus on Preservation



Warm Season: Focus on Preservation



LAYOUT 4: MASTER GARDENER'S GARDEN

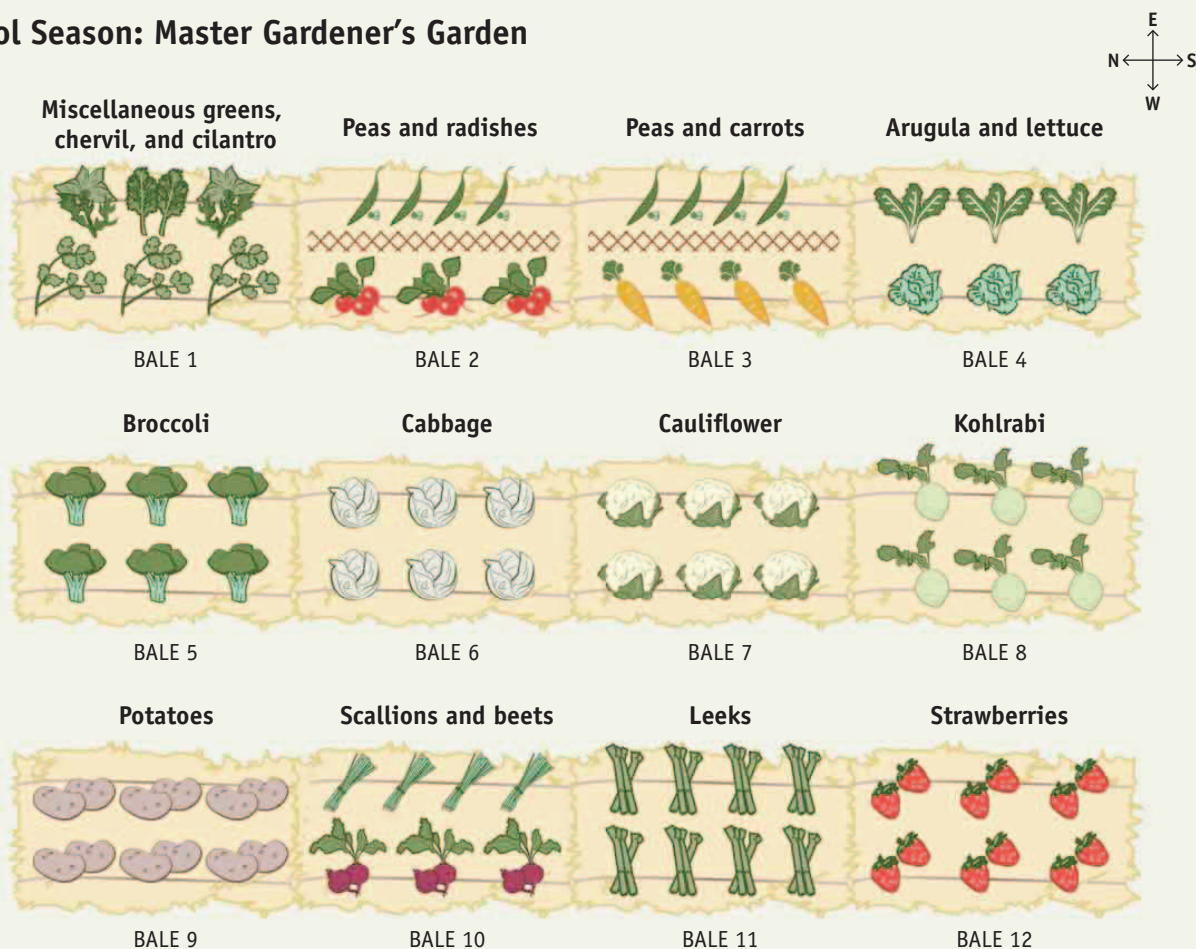
Expanding the garden to 12 bales means you can plant a wider selection of crops or grow larger amounts of your favorites to both preserve and enjoy fresh. In this design, one row has a trellis support across the two middle bales, while the center row has trellis across its full length.

The main new feature incorporated into this garden is a bale of strawberries. Plant these in early spring, tend through the summer, and harvest in the fall.

In the spring garden, keep the peas on the trellises in the center bales of the first row. These can be any variety you like or a combination. Don't mix shelling peas with the edible-podded ones, however, or you may not be able to tell the difference at harvest time. Carrots and radishes grow well with peas. Plant one side, wait 2 weeks, and plant the other side.

Crops of the cabbage family play the starring role in the middle bales. The trellis supports the tomatoes and other crops in summer, and in spring, it can elevate a floating row cover for protection from insect pests.

Cool Season: Master Gardener's Garden



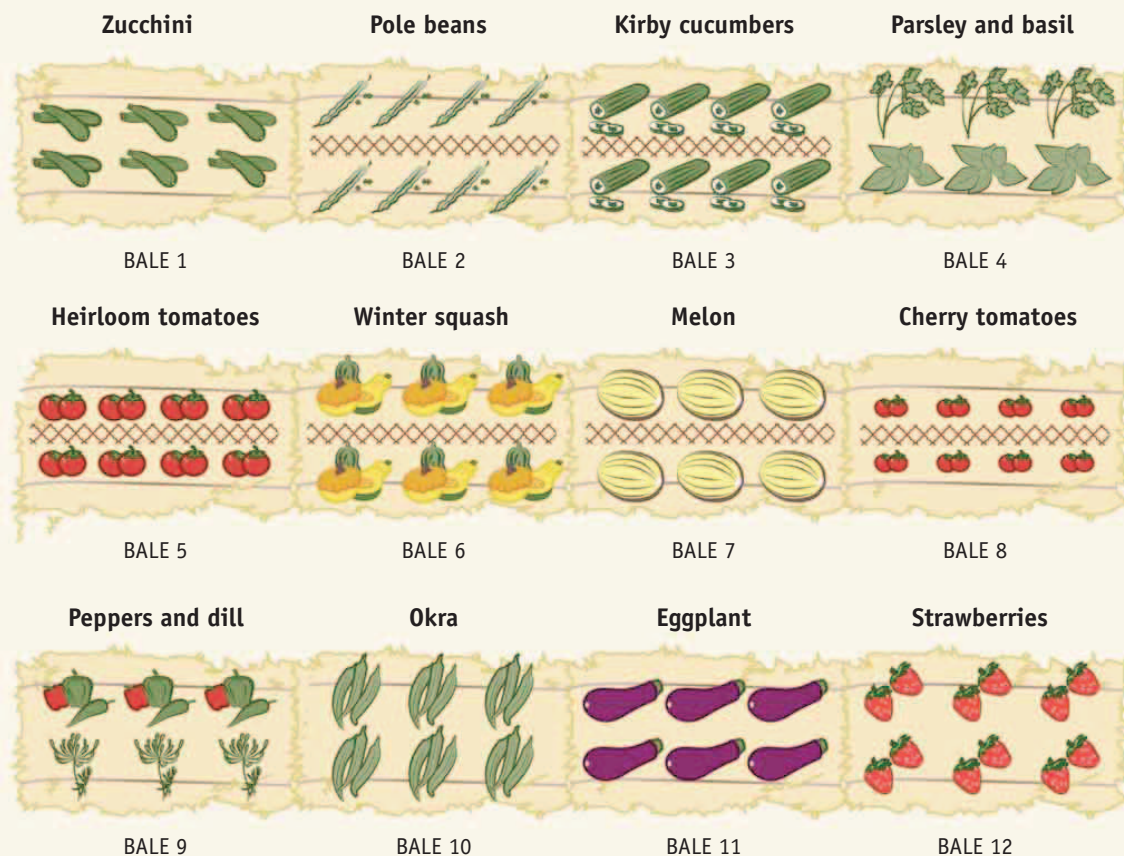
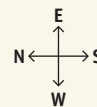
Potatoes have a bale in this garden. One bale only produces about 8 pounds (3.5kg) of potatoes. You also could plant onions in this spot if you like.

Leeks are included in the spring garden, followed by eggplant, which can be set out before the beets have been harvested. Small transplants are relatively easy to insert near an existing crop without creating too much disturbance.

The summer garden includes heirloom tomatoes and melons, as well as peppers and okra, and the latter both need a long, warm growing season. If your climate doesn't provide that, consider growing bush beans or summer squash, either of which matures rapidly.

Scallions, various herbs, and edible flowers lend themselves to growing in the spaces on the ends and sides of bales and in the space where two bales abut each other. Try New Zealand spinach, nasturtiums, parsley, storage onions, shallots, and garlic.

Warm Season: Master Gardener's Garden



Setting Up Your Bales

When your site is ready and you've decided on the layout of bales you'll use and the nature and location of any trellises you'll need, it's time to set up your bales.

If you have a mulched spot with fabric or another weed blocker underneath, you'll want to rake back the mulch and place the bales directly on the blocker to avoid wasting mulch under the bales. If you're setting up the garden all at once, wait until after the bales are placed before spreading the mulch on the paths.



IN LINE

A straight line of bales is probably the easiest to work with, although you can use practically any arrangement that suits your available space. The rest of this section's discussion assumes your bales are in a straight line, or perhaps more than one line, parallel to each other.

Bales are approximately 4 feet (1.25m) long, so two placed end to end totals about 8 feet (2.5m) in length. This is convenient, as lumber and other materials you may need for construction of trellis supports comes in 8-foot (2.5m) lengths. (More on trellises later.)

Keep the bales running straight by measuring their distance from some convenient fixed point. Nothing looks worse than a crooked row of bales, and haphazard arrangement makes installing all the other components of the garden less convenient.

Butt the ends of the bales together as tightly as possible. This "joint" between the bales can be used for planting, if the bales are sufficiently close. If you're using a trellis, you can place one of the trellis supports at the end of the row of bales as a back brace prior to placing the bales.

Now is also the time to inspect each bale to be sure the string has not come loose or is not damaged and threatening to

break. You want bales to remain as tightly bound as possible for the entire season. This helps with the decomposition process and provides support for plant roots. If any strings look questionable, as a backup, tie on additional ones and pull them as tight as you can. Tie the ends of each string together with a surgeon's knot; tie it like a square knot, but double the first loops of the string to prevent it from loosening as you tie the second, single loop.

And don't worry if you don't have bailer twine. Any sufficiently strong twine or rope will work. You can retrieve and discard nylon or other nonbiodegradable materials as you clean up your garden at the end of the season.

OTHER CONFIGURATIONS

If you stack your bales, it's a good idea to use tall stakes to prevent the highest stack from tipping over. You can use metal T-posts driven into the ground for this purpose. Center a post behind each stack of bales.

If your straw bale garden must be set up on a grade, place your bales parallel to the slope, not perpendicular to it. Start at the lower end, install a post as a backstop, and work up the hill placing bales end to end. It will be easy to keep them tight if you kick each one, firmly "planting" it against the downhill bale as you install it.

LEAVE ADEQUATE PATHS

Be sure to leave room between your rows of bales, and around any other configuration, to permit you to roll a wheelbarrow or garden cart between them. This will make it much easier to move articles around the garden at both planting and harvest times. Ideally, paths should be about 4 feet (1.25m) wide. Anything closer than 2 feet (.5m) will make it difficult to move and work in your garden.



Building Trellises

Many kinds of vegetables grow best with a trellis, or a support, upon which they can climb. Pole beans, peas, cucumbers, many squashes, and tomatoes all benefit from having a framework to grow up and on. These plants climb differently, however, so they need different types of trellises.



Twiners Pole beans are “twiners.” The main stem spirals around the support, climbing ever upward as the bean grows. Pole beans can be grown on straight poles about 1 inch (2.5cm) in diameter. Drive the poles down through the center of the bale and into the ground below for maximum stability. A pole about 8 feet (2.5m) should support pole beans nicely. Pole beans will also grow on a trellis made of strings or netting. If you go this route, plan on discarding the trellis material at the end of the season because untangling it from the tough bean vines can be a challenge.



Tendrill climbers Peas and members of the squash family produce tendrils, modified leaves that wrap around supports and then contract like a spring to raise the plant stem a few inches higher. Tendrils like to grab thin supports, like strings or other vines. You can purchase a nylon trellis net to support them, or use sisal twine to make your own.

Indeterminate tomatoes Tomatoes that produce a lot of vines, known horticulturally as “indeterminate” tomatoes, need special attention. They can be supported individually (more on this later), or you can use a string or wire trellis to support them. Tomatoes do not naturally climb on their own, so you’ll have to tie them to the trellis or weave the stems in and out of a string trellis. Given that some tomato varieties can produce large, heavy fruits, a wire trellis is the best way to go, as it won’t sag as the fruit develops. This is also true for melons and squashes that produce heavy fruits. You don’t want the entire trellis to collapse just as harvest time rolls around!

INSTALLING THE POSTS

When constructing your trellis, think about what material will work best for what you're growing. The posts, or uprights, of the trellis carry the majority of the weight, so you want them to be as sturdy as possible.

Steel T-posts offer an inexpensive and easy-to-install trellis support. They come in a variety of lengths; 8 foot (2.5m) and 10 foot (3m) posts are the most useful for straw bale gardens. T-posts are relatively easy to remove, compared to wooden posts, and last many seasons.

When installing a T-post, use a level to ensure you have it straight and then use a post pounder to sink the post into the bale and the ground below. A post pounder is the only safe way to drive the posts into the ground. Using a sledge hammer could damage the post—and you, if you miss the post and hit your hand or wrist. When using the post pounder, make each stroke steady, strong, and powerful, but don't raise the tool so high that it comes off the top of the post.

Wooden posts are another option, but they take a bit more work to install. You must first dig a hole about 2 feet (.5m) deep using a post hole digger. Depending on your soil, this task can be a lot of work. Once you've dug the holes, however, installing the post is simple. Two people are required—one holds the post plumb, using a level, and the other person fills the hole around the base of the post with dirt, packing it as tightly as possible with a blunt instrument such as a board. If you opt for wooden posts, use screws to attach any other components. (Be sure they're exterior screws so they won't rust.) Don't nail into the posts, or you could knock them out of plumb.

It's best to install the posts as you place your straw bales, allowing for one post for each pair of bales and a post at each end of the row—post, bale, bale, post, etc.



CONSTRUCTING THE TRELLISES

When the posts are in place, you next attach cross members between each pair of posts to keep them from leaning inward from the weight of the growing crops. Wooden boards that are 2 by 4 inches (5 by 10cm) are the most widely available and simplest material for this purpose, regardless of the type of posts you're using.

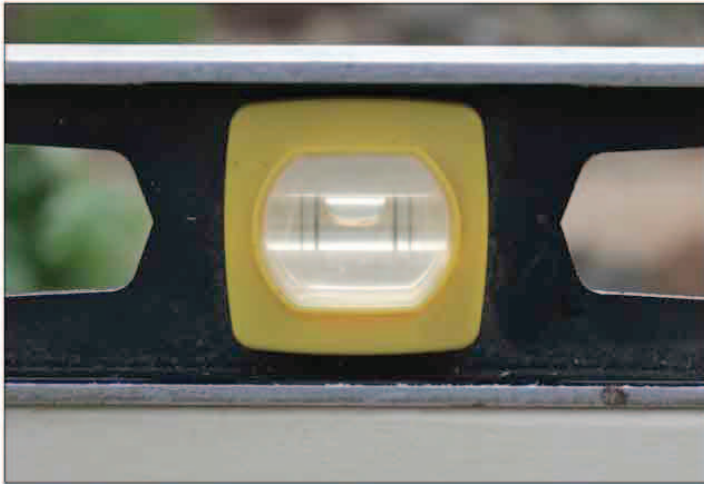
If you're using wooden posts, simply screw the cross members to them. If you're using steel T-posts, you'll have to affix the cross members to the posts with wire. Here's how:

STEP 1. With a circular saw, cut a notch about $\frac{1}{4}$ inch (.5cm) wide and $\frac{1}{2}$ inch (1.25cm) deep into each end of each board. This notch will fit over the lip on the T-post.



STEP 2. Using a $\frac{1}{4}$ -inch (.5cm) drill bit, drill a hole in each board 1 inch (2.5cm) down from the top and 2 inches (5cm) in from the end. This will house the wire you'll use to wrap around the T-post.





STEP 3. Hold the board up to the cross members, and check that it's level.



STEP 4. Thread the wire through the hole in the board, and wrap it around the T-post. Use pliers to pull the wire snug and twist it to secure it.



STEP 5. Push the twisted ends down and against the T-post so they're safely out of the way.

When your posts and cross members are in place, it's time to construct the rest of the trellis. You can use a few different types of trellis setup.

A *wire trellis* is the simplest means of supporting tomatoes or any other plant you want to tie to the trellis by hand. A wire trellis is simply a pair of wires strung along the length of the bales and wrapped around the T-posts. Install the first wire about 10 inches (25cm) above the top of the bales, and the second about 20 inches (50cm) above that. You can also use this arrangement to give added strength to a string trellis.



When constructing a wire trellis, loop the wire around the T-post above one of the lugs.

If you use wooden posts, you need to insert *screw eyes* at the appropriate points on each one to hold the wire. Predrill holes in your posts to make installing the screws easier.

For either type of support post, use 12- or 14-gauge galvanized utility wire, available at hardware stores. Any smaller gauge could break under the weight of crops, and anything heavier is difficult to bend and twist by hand.



Metal screw eyes will hold wire trellis in place on wooden posts.

You'll need a pair of heavy work gloves to protect your hands while working with the wire. Also purchase a pair of lineman's pliers. They make short work of cutting, bending, and twisting heavy-gauge wire.



This string trellis is supported by a steel framework, but simpler arrangements work fine, too.



Pole beans climb a string trellis.

Or you can use a variety of *string trellises*. To install a *nylon trellis netting*, for example, begin at one end and attach the netting to the first cross member and end post so the bottom string is about 6 inches (15cm) above the top of the bale. Work your way down the row, gently pulling the trellis tight as you go. Use exterior-grade plastic zip ties, string, or lengths of 20-gauge wire to secure the netting to the supports.

Although it's more time-consuming to install, you can use sisal twine to create a string trellis. If you've installed a pair of horizontal wires along the length of the row, attach string running from the upper cross member to the bottom wire, looping it around the upper wire. This trellis works for a wide variety of vegetables, and at the end of the season, you cut both ends of the string and compost it.

Various types of *plastic netting* are also available. These materials are easy to install, but they're difficult to clean for reuse at the end of the season. Be sure any plastic you use can withstand exposure to sunlight. Anything not intended to resist the damaging effects of ultraviolet light will fail before the end of the growing season.

Using Individual Plant Supports

You might not want to go to all the trouble and expense of installing an elaborate trellis. For example, if you only grow “bush” varieties that get about 2 feet (.5m) tall and stop growing, you won’t need a trellis. Many popular vine crops are available in bush forms, including beans, peas, and cucurbits.

On the other hand, you may only need a trellis for a part of the season, or for a single crop, such as tomatoes. In any of these situations, it makes sense to use individual plant supports.

STAKES AND POLES

A simple vertical stake about 1 inch (2.5cm) in diameter can support pole beans or a tomato plant. The beans climb by themselves, but the tomato needs to be tied to the stake as it grows. This is the classic way to support tomatoes and costs the least, although you do have to take time each week to tie up the plants.

Hardwood stakes are the most durable. They must be long enough to extend through the bale and about 1 foot (30.5cm) into the ground below, while leaving enough sticking out of the bale to accommodate the plants. This means a pole at least 8 feet (2.5m) long is required; 10 feet (3m) would be even better.

It’ll be easy to push the pointed end of the stake down through the bale. When it reaches the soil line, use a small sledge hammer to drive it securely into the ground. Place a block of wood on top of the stake and hit the block with the hammer to minimize damage to the end of the stake. Set a stake wherever you want a plant, positioning slightly closer to one edge of the bale, so the plant will end up in the bale’s center. It’s always better to install stakes at or before planting time. Putting them in later risks damaging the plant’s roots.

TUTEURS

A *tuteur* (French for “tutor” or “trainer”) is a decorative plant support, often in the shape of a tall pyramid or obelisk. The best ones are made of wrought iron and last many seasons. You may also see them made from wood. These are less durable but just as effective as plant supports.

You can use a tuteur for peas, determinate tomatoes, half-runner beans, and compact cucumbers. For pole beans or larger cucurbits, you’ll need a tuteur of impressive proportions, but they’re widely available.

TOMATO CAGES

Commercial tomato cages come in various designs, but they all suffer from the same drawback: only the largest ones are worth purchasing, and even those are suitable only for “determinate” tomatoes that seldom get taller than 4 feet (1.25m). Tomato cages are great for peas, peppers, eggplant, and bush squashes.

Some cages are shaped like an inverted cone made of galvanized wire. Some are square, designed to fold flat for easy storage. They all work well, but don’t expect them to be suitable for an indeterminate tomato or a full-size cucumber.

Just stick the wire legs directly into the bale. For extra stability, you can add a stake, driven into the ground on the outside of the bale and secured to the cage with zip ties or wire.

To make a truly suitable tomato cage, you need a piece of steel concrete reinforcing mesh. This is made of heavy-gauge wire and comes in panels about 8 by 4 feet (2.5 by 1.25m). When one of the panels is formed into a tube 8 feet (2.5 m) long, it’s the perfect diameter for a tomato cage. Before rolling, bend the wire along one long edge of the panel to form hooks about 1 inch (2.5cm) long. Use these hooks to engage the opposite edge of the panel after you roll it into a tube to hold the panel in place. If necessary, you can add thin wire along the joined edges for additional strength and stability. Place the cage over the tomato plant, centering the plant in the enclosure. Drive a stake into the ground on the outside of the bale, and attach the cage to it with lengths of galvanized wire.



Fertilizer Basics

All plants need three major mineral nutrients: nitrogen (N), phosphorus (P), and potassium (K). When any of these three is either in short supply or in great excess, problems can arise.

Nitrogen Of the three major nutrients, nitrogen is typically the one in short supply in soil. Nitrogen must be in a chemical form that plants can absorb. Nitrogen in this form is called “fixed” or “available” nitrogen. The most common form is the nitrate ion, NO_3^- . Other chemical forms of nitrogen frequently seen are ammonium ion, NH_4^+ , and urea, $\text{CO}(\text{NH}_2)_2$.

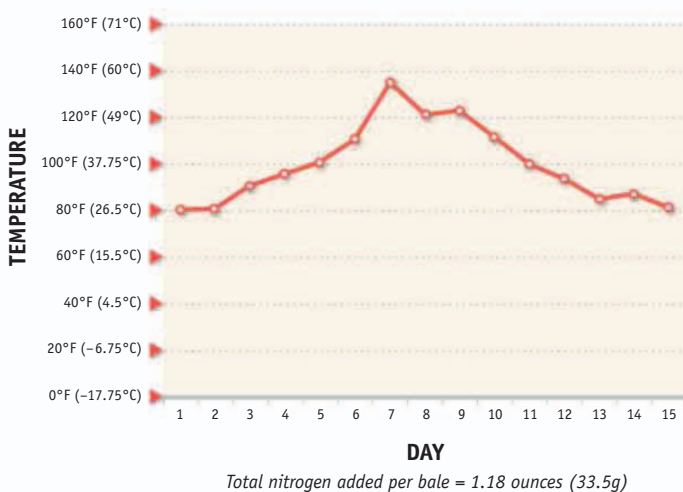
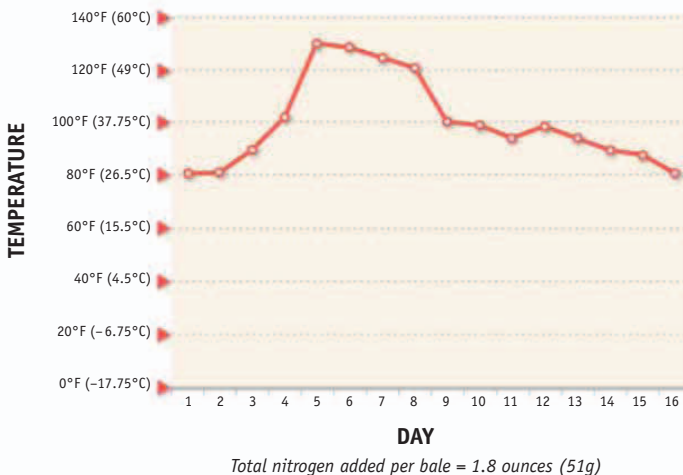
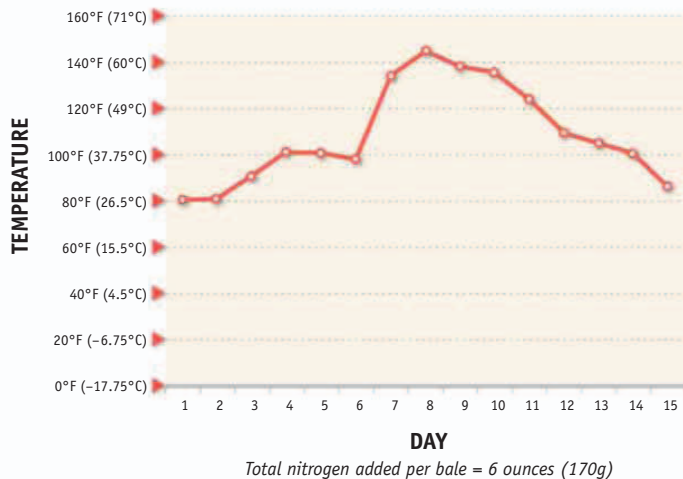
A shortage of nitrogen is usually indicated by pale, yellowed leaves and slow or no growth. Nitrogen deficiency must immediately be corrected, or you could yield no harvest. Fortunately, this is rarely a problem with straw bale gardens.

Phosphorus Phosphorus, important for root development, is rarely in short supply in soils, and the use of a balanced fertilizer during the bale conditioning process supplies all your plants will need for a season.

Potassium Potassium is typically associated with flower and fruit production, and will also be available in adequate supply if you use a balanced fertilizer during conditioning.

WHAT'S “BALANCED”?

A balanced fertilizer is one that contains relatively equal proportions of nitrogen, phosphorus, and potassium by weight. The label always presents these numbers in “N-P-K” order. Thus, a 10-10-10 fertilizer is balanced, but a 20-6-8 is not.



WHAT ABOUT ORGANIC?

Many vegetable gardeners will want to grow “organically,” or using plant nutrients derived from “natural” sources rather than synthetic chemicals.

Both organic and inorganic nitrogen sources can be used to condition bales.

The accompanying charts show the internal temperatures of three bales over a period of time, each conditioned using a different fertilizer. Granular 10-10-10 lawn fertilizer (top chart), organic cottonseed meal (center chart), and soluble fertilizer (bottom chart) all gave essentially the same results.

As with bacteria, to plants the source of the nitrogen does not matter, so long as it is in sufficient supply.

COMPARING FERTILIZERS

You can evaluate any kind of fertilizer on the basis of the amount of nitrogen it contains and how much this nitrogen costs per pound. Simply note the cost of the fertilizer per pound and the percent by weight of nitrogen listed on the label. Remember, it’s always “N-P-K.” A notation of 10-6-9, for example, is 10 percent nitrogen. Then divide the cost per pound by the decimal percent nitrogen. If you do this same calculation for different brands of fertilizer, you may be quite surprised at the results.

Organic Fertilizers

If you don't want to use chemical fertilizers in your straw bale garden, you have several organic options. Earlier I explained how to interpret the N-P-K (nitrogen, phosphorous, and potassium) numbers on a fertilizer label and compare the value offered by different formulations. The same applies to organic fertilizers, too.

Organic fertilizers can consist either of a single component, such as bone meal, that's high in one nutrient and low in the others, or can be commercially blended products offering a balanced nutrient profile (that is, 7-7-7 or 10-10-10). Commercially blended organic fertilizers come close to matching the convenience of chemical products but are frequently much more expensive.



CROP AND SEED MEALS

Certain crop wastes are ground into meals that break down rapidly enough to be used as garden fertilizers. Two common examples are cottonseed and alfalfa meals. Both provide nitrogen and less of the other nutrients, although they do contain a considerable quantity of organic matter. Cottonseed meal, for example, is 6-2-2. Besides alfalfa, soybean and kelp are also made into meal for organic gardening. It's possible to purchase certified organic meals from cotton, alfalfa, and soybeans.



SLAUGHTERHOUSE BY-PRODUCTS

A variety of by-products from commercial meat production operations are utilized in organic gardening. Blood meal, made from dehydrated animal blood, is high in nitrogen. Bone meal contains some nitrogen but is most often used as a phosphorus supplement. Feather meal from poultry production is also a good nitrogen source. All these products also supply minor nutrients, such as sulfur. Certified organic products in these

categories, that is, blood meal from organically raised cattle, for example, are far less common than organically produced plant products.

FEEDLOT BY-PRODUCTS

Manure is a major by-product of all livestock production, and when processed by dehydration at high temperatures or by composting, becomes safe to use in the garden. Composted manure from cattle, sheep, rabbits, and poultry is commercially available. Dehydrated poultry manure is a component of some formulated commercial fertilizers, as it is high in nitrogen. When composted, manures tend to have low, balanced levels of all three major nutrients. An N-P-K of 1-1-1 is not unusual.

FROM THE SEA

Kelp meal, ground up seaweed harvested from offshore “plantations,” is high in potassium, offers a small amount of nitrogen, and contains numerous trace elements. Fish meal, a rich source of both nitrogen and phosphorus, is a by-product of commercial fishing. Once dumped overboard, the “by-catch” is dehydrated and ground into meal that can be used as fertilizer.

FROM YOUR KITCHEN

One of the best organic fertilizers, compost, can be made at home, using scraps from your kitchen and other common items. Compost typically has an N-P-K like composted manure, low levels of all three major nutrients. It is rich in organic matter, too. You can make all the compost you need for a straw bale garden using last season’s bales, vegetable trimmings, and eggshells from your kitchen, and a nitrogen source such as cottonseed meal.

If you’re using a sterile soil-less potting mix to start seeds directly in your straw bales, you can substitute homemade compost for the mix.



Conditioning Your Bales

I recommend “conditioning” your straw bales before you plant your vegetable crops. The conditioning process is simple and uncomplicated. It involves encouraging beneficial bacteria to begin decomposing the bale, releasing plant nutrients and heat, before you introduce plants or seeds. Only two items are required for conditioning: water and a nitrogen source, that is, fertilizer. The conditioning process takes about 2 weeks.



DAY 1

Set up your bales where you want them, with the cut ends of the straw on top. Don't undo the strings; they must remain in place to hold the bale together and keep the straw compressed, an aid to its decomposition. If you cut or break a string accidentally, quickly tie a new one around the bale as tightly as possible. If you plan on crops that require a trellis, installing it now is easier than doing so later, when the plants have begun to grow.

Sprinkle 2 household measuring cups of 10-10-10 fertilizer, or an equivalent amount of cottonseed meal, over the top of each bale as evenly as you can. Perfection here is not important.

Or use soluble fertilizer and apply with a watering can. Water the bale first, if you choose this route.

Water the bales thoroughly, flushing all the fertilizer down into the interior of the bale. You may be surprised at the amount of water the bales will absorb, but don't stop until water begins to run out the bottom of each bale and they're all thoroughly soaked. Using a hose end “water breaker” or “rose” to apply a gentle deluge.



How much fertilizer should you use? Each bale requires available nitrogen to get the decomposition process started. To determine how much of a given fertilizer to use, look at the package. A product labeled “20-10-10” is 20 percent available nitrogen by weight. A fertilizer labeled “5-4-5” must be applied at four times the rate of the 20-10-10, since it contains only one fourth as much nitrogen per pound. Each bale should receive a total of 2 to 4 ounces (57 to 114g) of nitrogen for proper conditioning. Simple math will help you arrive at the correct amount.

DAY 2

On the second day, all you have to do is water the bales again. They won’t soak up as much water this time, but keep at it until water runs from the bottom of the bale.



DAY 3

For the next four days, you'll establish a routine of adding more nitrogen and water to the bales to keep the conditioning process going.

On day 3, either apply 1 cup of 10-10-10 fertilizer and then water the bale, or use half the previous dose of cottonseed meal. Alternatively, apply half the previous dose of soluble fertilizer after watering.

DAY 4

Day 4 is another water-only day. Water the bales again until water runs out the bottom of the bale. You'll notice that this requires much less water than was needed earlier in the week because the bales have become saturated with water.

This is a good time to start checking the temperature of your bales. As the conditioning process continues, the bales will heat up. The internal temperature can be quite high, almost 150°F (65.5°C). You can use any method that allows you to measure the temperature about 1 foot (30.5cm) inside the bale. A cooking thermometer with a long metal probe works well, or you can use a digital indoor/outdoor thermometer with a sensor on a long cable. Push a piece of PVC pipe into the bale to make a path for the sensor if you use the digital thermometer.

Make a note of the date and the temperature. You'll use this information to determine when the bales are ready to plant.





DAY 5

On day 5, sprinkle another 1 cup of 10-10-10 fertilizer, or an equivalent amount of cottonseed meal, evenly over the top of each bale. Again, water the bales. If using soluble fertilizer, water the bales first and then add the appropriate amount with a watering can. The straw may be showing signs of decomposition by now, for example, changing color.

DAY 6

Day 6 is yet another water-only day. Measure and record the temperature of the bales.

By now, the straw will have darkened in color on top of the bales. You also may see mushroom caps beginning to poke through the top. The mushrooms are harmless, but don't eat them.

DAY 7

On day 7, first measure and record the temperature of a bale. (Taking the temperature of the bale after watering results in a false low reading because the water cools the bale temporarily. Always measure the temperature of the bale before watering.)

Next, repeat the fertilizer addition and watering procedure as on day 5.

DAY 8

It's time to stop adding nitrogen because you've added enough to get the bales "cooking" properly. During the next few days, the temperature of the bales will continue to rise, and it may reach its maximum. You'll also see more mushrooms growing out of the bales.

On day 8, first check and record the temperature of the bales. Water all the bales again, making sure to keep at it until water runs out the bottom of the bale. By today, you should definitely see mushrooms sprouting from the bales in profusion. If they do not appear, don't worry, as the bales will be fine for gardening, but most bales will grow mushrooms.

DAY 9

Take the temperature of a bale and record it. If you use a spreadsheet program to keep track of the temperature trend, you can create a graph showing the progress of the conditioning process. Water the bales thoroughly again today.

DAY 10

Check the temperature and record it, and water the bales again.

Besides recording the temperature and watering the bales, there's little to do today. By now, the internal temperature should have reached its peak. It may even start to decline at this point, with only a few more days to go.

The bales grow the same mushroom, regardless of where you live. The inky cap, or shaggy mane, mushroom (*Coprinus comatus*) is found in grasslands throughout Europe and North America and is ubiquitous on straw produced in these locations. It's also been introduced to other countries. For example, it's so common in Australia that its image is on a postage stamp.





DAY 11

Days 11 through 14 mark the final phase of conditioning.

The actual time required for complete conditioning depends on a host of factors. The ambient temperature affects the rate at which conditioning proceeds. The higher the daytime temperature, the faster the bales will decompose. Conditioning also depends on the amount of nitrogen and water you added. These vary for all sorts of reasons from one gardener to another. I might use a level cup, whereas you may use a heaping one, when measuring fertilizer. If so, your bales may go a little faster than mine. The nature of the bale itself, whether loosely or tightly packed, for example, also affects the conditioning rate. A loosely packed bale will decompose more quickly simply because there's less dry matter present.

On day 11, measure and record the temperature and then water the bales thoroughly. You may get another flush of mushrooms around this time.

DAY 12

All that's needed today is to measure the temperature and water the bales again. You should note a definite temperature drop by this point.

DAY 13

The bales should have reached a temperature only a little above ambient by today. Water them again after taking the temperature.

DAY 14

By now, 2 weeks after the bales were first set up, the conditioning process should be complete and the bales should be no warmer than the surrounding air. Water them one more time, and they are ready for planting.

Your conditioned bales will be a little darker, and a lot wetter, but otherwise look much as they did when you began.

If it's necessary to delay planting for a day or two, be sure to continue to water the bales thoroughly every day. If the bales have not fully cooled, wait.

It's also possible that the conditioning cycle will have gone to completion a little faster than anticipated. Once your bales have reached ambient temperature, go ahead and plant, even though 14 days have not yet elapsed.

Irrigation

Vegetables generally require 1 inch (2.5cm) of water a week. If rainfall is insufficient, it's important to make up the difference via irrigation.

Water costs vary from one location to another. In dry areas, the cost of water can be a significant expense. Making efficient use of water can help save on costs and keep plants growing steadily.



BASIC EQUIPMENT

An old-fashioned watering can may be enough if your irrigation needs are infrequent and your garden small. Most people opt to run a garden hose from the tap to supply the garden. This is far less work than toting water by hand.

Hose attachments, such as a watering wand and on/off valve, make watering your garden less of a chore. The wand makes it easy to direct water precisely where you want it. A valve at the delivery end of the hose prevents you having to run back to the tap to shut off the supply each time you pause. Choose a “rose” for the end of the watering wand to deliver a shower rather than a forceful stream.

WHEN TO WATER

Water your straw bale garden early in the day to allow wet foliage to dry before dark. This helps prevent fungal diseases.

HOW TO WATER

When hand watering, try not to wet the foliage of the plants. Apply water around the roots of the plants and to the surrounding straw. Water until the bales appear to be saturated.

Don't worry about overwatering. This is virtually impossible with a straw bale garden because the straw drains well while holding some moisture.

DRIP IRRIGATION

Another method of delivering water directly to the roots of plants is drip irrigation. The equipment required is simple. The supply hose is connected to a “soaker” hose that allows water to drip out slowly. Water is deposited slowly and steadily, allowing plants to derive the maximum benefit.

You benefit as well because you can turn on the hose and then ignore it for a time while you do other things.

Numerous types of drip irrigation systems are available, from the simple soaker hose to more elaborate systems suitable for a large garden with many bales. All of these devices work basically in the same way.

AUTOMATED IRRIGATION

Using a drip irrigation system allows for automated watering via a hose timer. This electro-mechanical device controls the water supply with a valve controlled by a programmable timer. These devices are widely available, are not too expensive, and can be used to run your drip irrigation system. Because overwatering is not an issue with a straw bale garden, you can set the timer to water for the same amount of time every day or every other day and then forget it. If you go away on vacation, the garden should be fine when you return.

You can also use a water timer to operate an overhead sprinkler system, like a lawn sprinkler. In a pinch, this is satisfactory, but sprinklers waste a lot of water. Some evaporates before it hits the soil, a lot may reach areas where it isn't needed, and more can simply run off if the application rate is too great. As a rule, overhead sprinkler irrigation is only advisable where water is cheap and abundant.

Sterile Soil-Less Growing Mix

Just about the only drawback to growing vegetables in straw bales is sowing seeds. Some small seeds simply fall too deeply within the bale to germinate—carrots are a good example. And many of these vegetables are root crops that don't transplant well. Nevertheless, once they're a few inches tall, all of them will grow happily in a straw bale.

To solve the problem of tiny seeds, you can apply a layer of sterile soil-less growing mix to the top of your bales.

CHOOSING A GROWING MIX

You can purchase a commercial growing mix or blend your own. Commercial mixes are usually composed of the same materials you can purchase in bulk and mix yourself—peat moss, composted bark, perlite, and sometimes a fertilizer component.

The choice between do-it-yourself and using ready-made really boils down to cost versus convenience. You can make a lot more mix for less money if you do it yourself, but commercial mix is a time-saver.

To create a satisfactory growing mix, combine two parts of peat moss with one part each of composted pine bark fines and perlite. Mix these components in a wheelbarrow using a hoe or spade until you have a uniform mixture.

PREPPING A BALE WITH SOIL

To properly cover a bale with growing mix, you need about 1 cubic foot (30.5 cubic cm) of mix for every two bales. Commercial mix is typically packaged in bags approximating this amount.



STEP 1. Spread $\frac{1}{2}$ cubic foot (15.25 cubic cm) of growing mix on top of each bale, smoothing and leveling it to a uniform depth.



STEP 2. Use a wood block or other tool to smooth the mix.



STEP 3. The layer will be about $1\frac{1}{2}$ inches (3.75cm) deep when you're done. Water well, and you're ready to plant seeds.

Sowing Seeds

Some vegetables do best when they're started from seeds sown directly in the garden. These include the following:

- Arugula
- Beans
- Beets
- Carrots
- Cilantro
- Corn
- Dill
- Endive
- Mustard greens
- Peas
- Radishes
- Scallions
- Turnips

Several other vegetables can be either sown directly or started in pots and transplanted. They include the following:

- Basil
- Cucumber
- Leeks
- Lettuce
- Miscellaneous greens
- Melons
- Okra
- Parsley
- Spinach



GENERAL RULES FOR SOWING SEED

Follow the recommendations on the seed packet for planting depth. If no recommendation is given, plant the seed no deeper than twice the seed's diameter. Some seeds, such as lettuce, require light to germinate and must not be covered too deeply.

Water the planting area just before sowing. This makes furrows or planting holes retain their shape and ensures that the seeds get plenty of water.

Seed packets typically give two spacing recommendations, the final spacing of plants within a row, and the distance between rows. This is a holdover from the days when just about everyone's garden was made up of neat rows of vegetables growing in the soil and the row spacing was needed to allow access for cultivation and to pick. When growing in straw bales, only the within-row spacing is important. Arrange the seeds so the plants are spaced evenly in all directions.

Imagine that the bale is marked off in squares arranged in a grid pattern. Each square will be as large as the recommended spacing between plants and you would put one seed in the middle of each square to achieve the final spacing. Use a stick to lay out a grid pattern on the soil, if you find it helps.

Then drop or sprinkle your seeds at the appropriate spacing. For example, let's say you're planting carrots at a final spacing of 4 inches (10cm). If your bale is close to the typical size of 24 by 48 inches (61 by 122cm), it can accommodate a total of 72 carrots. A 4-inch grid would be 6 squares wide and 12 squares long. Similarly, if you're growing tomatoes, which need a spacing of 2 feet (.5m), a bale will hold two plants.



Planting Transplants

Some vegetable plants do best when they're started in small pots indoors and transplanted to the garden later, when they're a bit larger. Many plants are delicate when they're small, and the young seedlings cannot easily cope with the harsh, changing conditions of outdoor life. By starting seedlings indoors, you allow them to grow a sturdy root system and produce enough leaves to sustain further growth. In fact, where possible, this is the best approach to take if you're a beginning gardener.

This also enables you to stretch the growing season. By growing plants for a month or two indoors prior to the beginning of the growing season, you'll produce a crop much earlier than if you'd started your plants directly in the ground at the proper planting time.

WHAT TO TRANSPLANT

Among the vegetables most commonly grown from transplant are all members of the cabbage family, or brassicas. These include broccoli, broccolini, brussels sprouts, cabbage, cauliflower, collards, kale, and kohlrabi. The seedlings of this group are finicky about their growing conditions, and early setbacks in growth typically significantly reduce production later on.

Tomatoes, peppers, and eggplant are also frequently grown from transplants produced in a greenhouse. In many areas of the temperate zone, the weather is too cool for too long to produce a successful crop of these plants unless they're started indoors in early spring.

Cucurbits, including cucumbers, squashes, and melons, all have a relatively long growing season and require warmth. They're routinely started in pots that will decompose, eliminating the need for disturbing the roots.

SOME UNCOMMON TRANSPLANTS

A few plants do very well if transplanted, but seldom are. These include beans, corn, lettuce, okra, and spinach. In most gardens, you need at least a dozen plants of each of these crops to make the harvest worth the trouble. That seems to be the only reason transplants aren't used.

GROWING YOUR OWN

If you have a place to grow indoors, you can have excellent results by producing your own transplants. Warm weather crops can be started indoors a month prior to the planting-out date, extending the season significantly.

If you have a sufficiently bright south-facing window and the temperature near it remains above 65°F (18°C) during the spring, you can probably grow lettuce and spinach seedlings without too much trouble. For the other crops mentioned in this section, you need supplemental artificial lighting.

GENERAL RULES FOR TRANSPLANTING

Transplanting seedlings is fairly easy. Here's how:



STEP 1.

Remove the plant from the nursery tray. If in a biodegradable pot, break off any pot material above the soil line.



STEP 2.

Using a spade or your hand, make a space in the straw to accommodate the root ball.



STEP 3.

Fill in around the root ball with additional soil-less growing mix to help hold the plant in place.



STEP 4.

Water the new transplant thoroughly.

Routine Garden Care

Your straw bale garden will go through several stages from inception to harvest. Stage 1 is the planning and site preparation stage. During stage 2, you get bales ready for planting, a process known as “conditioning.” Next comes the fun of planting, and after that, the routine care that keeps the garden thriving for the remainder of the season.

The early stages of the garden occur during the frenzied first 3 weeks of spring, after the weather has warmed sufficiently to make working outdoors a pleasant experience. During the lazy summer days that follow, caring for your straw bale garden may prove to be the most pleasant hours of your week.

IRRIGATION

Your chief obligation during the growing season is to ensure your straw bale garden receives sufficient moisture. It's impossible to overwater a straw bale garden, so you might want to utilize an automated method of irrigation. These work particularly well if you must be away from your home for any length of time.

Otherwise, just pick a time during the day when you can spare a few minutes and thoroughly soak each bale with the hose. Water enters the plant through the roots, so soak the bale, where the roots are, not the leaves. Doing otherwise invites fungal infestation.

And water early in the day, so the garden can dry off before nightfall.

TRAINING

The second most common summer garden chore involves tying tomatoes and other plants to the wire trellis, if you use one. Even tomatoes fully enclosed in a cage may need some help to maintain their position, especially as fruits begin to form and the weight of the branches increases. The same is true for peppers. Branches that are not supported can snap off due to the weight of maturing fruit.



It's helpful to keep a supply of cloth plant ties, such as an old bed sheet cut into strips about 1 inch (2.5cm) wide and 8 inches (20.25cm) in length. Grab a pocketful of these on your way out to the garden so you're prepared to tie up stems in danger of breaking. In addition to tomatoes and peppers, some squashes may need this kind of help.

You can also use twine or twist ties for securing plant stems. Choose a twine at least ¼ inch (.5cm) in diameter to avoid cutting the stems. For the same reason, search out special foam-coated twist ties, or "soft ties" made specifically for use in the garden. Damage inflicted by ties can strangle and kill the stem. Take care not to tie too tightly, even if using these soft materials.

Climbing squashes and melons need special care because the fruits are so heavy they may drop before ripening. Use a strip of cloth about 6 inches (15.25cm) wide and 1 foot (30.5cm) long to create a "hammock" for the fruits. Tie each end of the hammock to the trellis, making sure it won't slide down under the weight of the developing fruit. Old hosiery is good for this use.

PEST CONTROL

Straw bale gardens don't often have pests, but if you do get an infestation of bugs, you should start control measures immediately and keep persevering until the pests are thwarted. (More on pests later.)

WEEDING

You'll almost never see a weed in a straw bale garden, but if one should somehow find its way in, pull it immediately. It's easy to extract roots from the loosely textured bales.



Dealing with Pests

Plants growing in straw bales are often so healthy and unstressed that pests are not a problem.

However, they're not 100 percent free of pests, so in this section, we look at some common ones found in North America and the best means of controlling them. Many other bugs and diseases not mentioned here can be controlled with the same methods recommended.

MILDEW

One of the most common leaf diseases is mildew, often a pale gray to blue dusting of powder on plant leaves, especially cucurbits, tomatoes, peppers, and sometimes spinach. The problem is caused by airborne spores that settle on the leaves and multiply into millions of tiny filaments that draw nutrients from within the host's leaves. The mildew fungus also blocks some of the sunlight from reaching the leaves.

One of the best control methods for mildew is avoiding wet leaves. Proper plant spacing, to permit adequate air circulation, is also important.

When mildew appears despite your best efforts, spray the leaves with neem oil. Neem oil is a natural fungicide and repels (or sometimes kills) insects, too. Mix the concentrate with water according to label directions, and spray until it drips from the leaves. Repeat the treatment every 2 or 3 days if mildew persists.

APHIDS

Aphids can be found on every continent except Antarctica, and they all feed by sucking the sugary sap from plant leaves and stems. They multiply rapidly, so that an arriving female can produce hundreds of offspring within a week of landing on one of your lettuce leaves. The offspring start feeding on the plant as soon as they hatch, and, in turn, leave more offspring, creating a vicious cycle.

One of the best ways to control aphids is to knock them off plants with a strong jet of water from the hose. Try that approach first, hitting them every day for 3 or 4 days in a row, before resorting to other measures.

Aphids are difficult to poison but can be smothered by coating them with insecticidal soap, a product sold in concentrated form at most garden centers. Dilute the concentrate according to the label directions.

CHEWING INSECTS

This is a big category and includes a number of beetles, distinctive insects with a hard, protective covering over their wings. There are more species of beetles than of any other insect group, and the ones that feed on crop plants can be serious pests. Because they chew on the leaves, this group of insects can be attacked with poisons that must be ingested.

You have several natural options for killing beetles. They include pyrethrin spray or dust, a product derived from chrysanthemums. Diatomaceous earth, a mineral dust, is composed of silica bits that slice up the insect's digestive tract when eaten or clog its respiratory apparatus when inhaled. A relatively new all-natural control is Spinosad, a product derived from certain bacteria in much the same way antibiotics are produced.

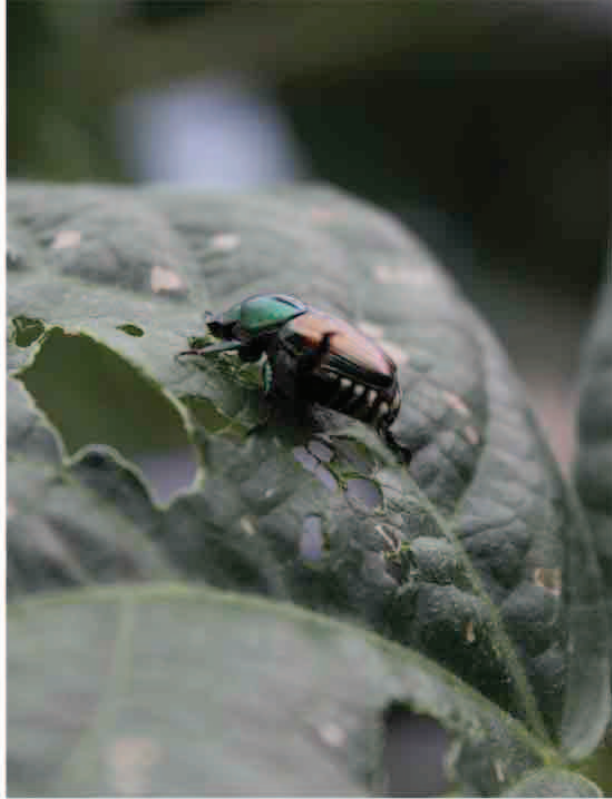
Caterpillars, the larvae of moths and butterflies, can be serious pests. They can be controlled by spraying or dusting plants with Bt, a product derived from *Bacillus thuringiensis*. Bt must be reapplied regularly.

OTHER PEST INSECTS

Several other types of insects, such as squash bugs and stink bugs, might respond to the soap treatment, or you can try combining neem oil and soap in the same sprayer.

Squash bugs like to hide in a cool, damp spot for the evening. Lay pieces of cardboard near your plants, check them first thing in the morning, and sweep any bugs you find into a bucket filled with soapy water.

Members of the squash/stink bug family lay distinctive eggs, often on the undersides of leaves. Check your plants regularly, and destroy any eggs you see attached to leaves or stems. Chances are, the eggs will hatch into something that will eat your crops.



Extending the Season

Once you start growing your own homegrown vegetables, you'll want them all year round. Unfortunately, unless you live in a semi-tropical or tropical climate zone, you'll need help to stretch out your growing season.

GAINING MORE TIME

During the conditioning process, the straw bales heat up because of the rapidly dividing bacteria teeming within them. After conditioning is completed, the bales will be about 10 degrees warmer than the surrounding air. Thus, you can plant a straw bale about 1 or 2 weeks earlier than the usual planting time for your area. This applies to both cool season and warm season plants. Straw bale gardening automatically extends the season by roughly a month in total.

You can add another week or more to each end of the season simply by covering your straw bale garden with clear plastic film. This will be much easier if you have constructed a trellis support above your bales, such as the T-post trellis, because the support can also provide a structure for holding the plastic row cover above your plants.

If you do not have a trellis support, you can purchase a self-supporting row cover. This consists of an insulating fabric with metal hoops to support it above crops.



Clear polyethylene film is sold in rolls, typically about 10 feet (3m) in width and various lengths. The width is just about perfect for the T-post trellis's height. The edges of the film can be weighted down at ground level with stones, soil, or landscape pins. You can secure one long edge and both ends, but leave one side arranged so you can lift the plastic easily to get at the vegetables growing inside this makeshift "greenhouse."

Using a covering early in the season allows you to trap the heat naturally generated by the bales. This roughly doubles the length of time you can add to your normal season. For example, the average date of last frost in my area is April 15. Beans can be planted up to 4 weeks prior to this date if no additional measures are taken to protect them, and they are grown directly in the ground or in a raised bed. If the beans are planted in a straw bale without covering, you can move that planting date back to the first of March, and with a covering, you might be able to start beans as early as February 15—a full 2 months earlier. You'd start to see fresh beans on the vines in early May.

By the same token, you can grow a fall-planted straw bale garden much later into winter than would otherwise be the case. To do so, you must condition new bales for the winter garden because they won't generate much heat on their own after a full season of use. In general, the same rules apply for fall season extension as for spring. If the average first frost date is October 15, you can grow cold-tolerant plants well into December with a covered straw bale garden.

LOCAL CONDITIONS RULE

Straw bale gardening makes extending the growing season relatively easy, but you can still have problems, depending on the exact conditions likely to prevail in your part of the world.

For example, in my area, in Tennessee, we have a series of late cold snaps so frequently our ancestors coined names for them. Thus, in mid-April the temperature will take a sudden dip, giving us a few days of "Dogwood Winter," because this weather even reliably occurs when white dogwood blooms make the trees appear covered in snow.

Late season weather, in particular, can be unpredictable. Keep this in mind when planning your straw bale garden. Now and then, the weather will just refuse to cooperate, and you'll find yourself with a lot of green tomatoes on dead vines. Such is life. Try again next year. Sometimes, the weather cooperates so well you can enjoy vine-ripened tomatoes in November.

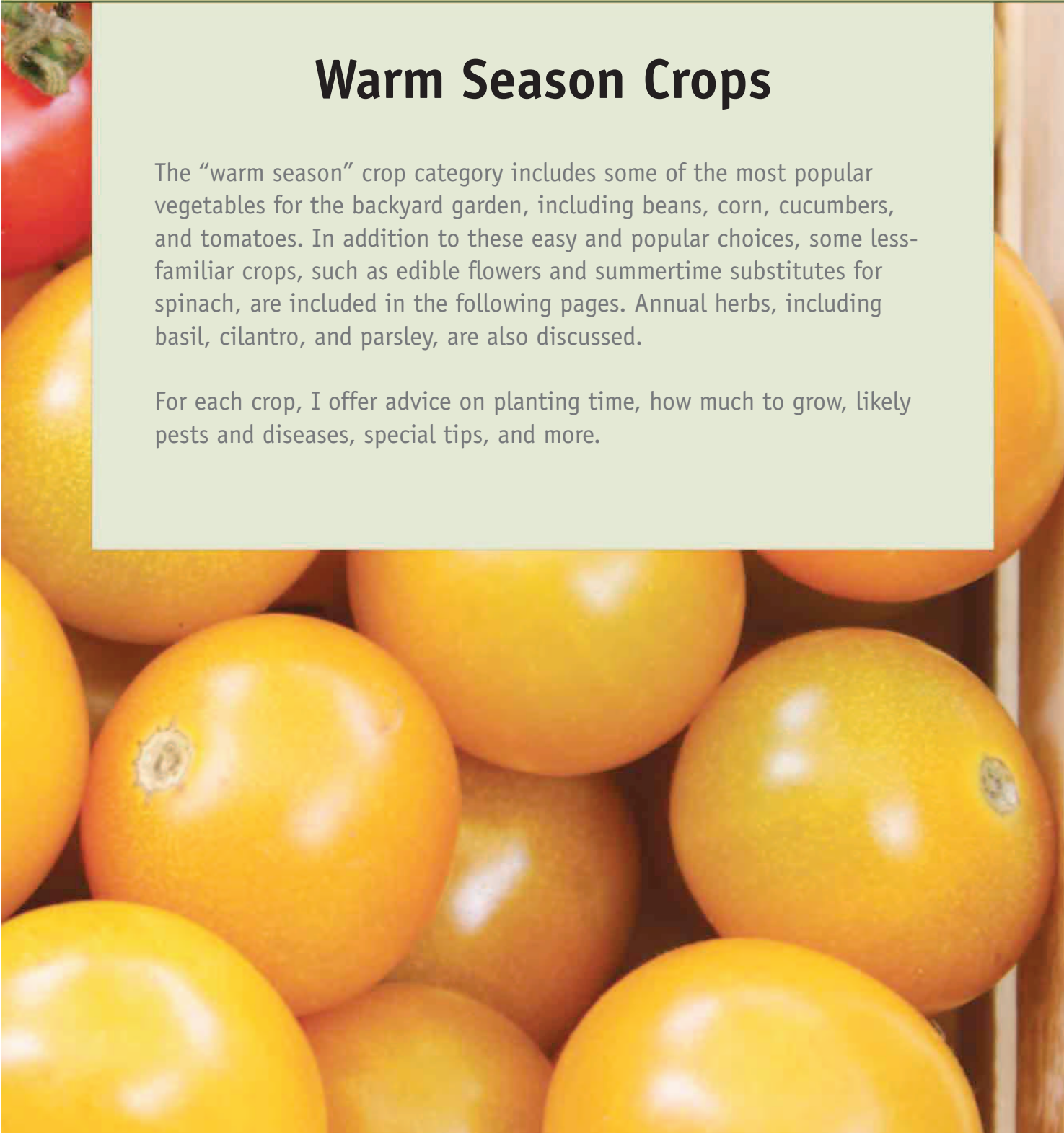


SECTION 3

Warm Season Crops

The “warm season” crop category includes some of the most popular vegetables for the backyard garden, including beans, corn, cucumbers, and tomatoes. In addition to these easy and popular choices, some less-familiar crops, such as edible flowers and summertime substitutes for spinach, are included in the following pages. Annual herbs, including basil, cilantro, and parsley, are also discussed.

For each crop, I offer advice on planting time, how much to grow, likely pests and diseases, special tips, and more.



Basil



Basil is an ancient herb derived from a variety of natural species. Several varieties are available, either as seeds or started plants.

“Sweet” basil is the most familiar variety. These plants have a rich, clovelike fragrance, and cultivated varieties include the lettuce-leaf types, with large, crinkled leaves. Several forms with red or purple leaves exist, as well as “Greek” basil types, which form compact mounds covered with relatively tiny leaves. Thai basil is yet another type. It carries a strong licorice note in addition to the basil flavor.

WHEN TO PLANT

Never expose basil to cold. Temperatures below 38°F (3°C) will cause the leaves to turn black and drop from the plant. So wait until the late spring weather is warm and settled before moving basil outdoors, even though the straw bale will be toasty warm.

HOW MUCH TO GROW

Basil is a productive crop, and even a few plants will probably yield more than you can use or preserve. Rather than devoting a whole bale to basil production, I suggest two plants per person in the household. These can be any combination of varieties you prefer, although the compact Greek basil will take up the least amount of room. Purple-leaf varieties add to your garden’s aesthetic interest, so consider including at least one or two plants.

PESTS AND DISEASES

Basil is generally free of pests and diseases, although plants might get powdery mildew if they're exposed to a long period of cool, cloudy, damp weather in summer. In good weather, basil grows rapidly and can outstrip an infestation. Rather than attempting to control an outbreak, simply pull up the plants and replace them when the weather is more favorable.

STARTING YOUR OWN SEEDS

Sow seeds in small pots about 1 month before you want to transplant them. Keep them at a minimum temperature of 65°F (18°C), and water sufficiently to prevent the soil from drying out. When they have at least two pairs of true leaves, they're ready to transplant to the garden. If weather conditions prevent transplanting to the bales, move the plants to larger containers to keep them going until transplantation is possible.

HARVESTING, STORING, AND PRESERVING

Starting about 2 weeks after transplanting, you can begin to harvest lightly. As the plants get larger, your harvest can also increase. Try to avoid taking more than ¼ of the top growth at any one harvest.

Store fresh basil at room temperature, placing the stems upright in a glass of water, like a bouquet of flowers. Do not place basil in the refrigerator, or the leaves will turn black. Fresh basil keeps about 3 days at room temperature.

You can preserve basil by mixing 1 ounce (25g) finely minced leaves with 4 ounces (110g) softened butter. Combine well, form the butter into a log, wrap in aluminum foil, and freeze.

Use basil butter as a condiment for roasted meats or vegetables, or simply spread it on warm bread and enjoy.

Dried basil loses much of its flavor, so preservation by drying is not recommended.

You can preserve basil flavor by infusing vinegar. Fill a wide-mouth container with as many lightly packed basil leaves as you can and add rice or white wine vinegar to cover. Refrigerate for 2 weeks. Strain off and keep the vinegar, discard the basil, refill the container with more fresh basil leaves, and return the seasoned vinegar to the container. Refrigerate for another 2 weeks. Strain, bottle, and refrigerate the flavored vinegar for up to 1 year.

SPECIAL TIPS

Basil plants are a nice option to fill in the space where two bales come together. Just place a spadeful of potting mix in the gap to support the roots long enough for them to grow into the adjacent bales.

Keep basil productive by pinching off the flowers as they form. But don't throw away the flowers! They're edible and can be used to flavor vinegar.

Harvest the plants regularly to keep them bushy and laden with fragrant foliage.

Bean, Green



Green, string, or snap beans are among the easiest and most productive backyard vegetable crops. A gift of the indigenous people of the New World to the European colonists in the sixteenth century, bean seeds are easy to save and have been carried around the world, resulting in a vast number of heirloom varieties.

Beans may be climbing, as with pole beans, or nonclimbing, as with “bush” beans. An intermediate form is known as a “half-runner” type. Half-runners only reach about 4 feet (1.25m) in height, whereas pole beans can grow twice as tall.

The shape, size, and color of pods and the beans within them have also contributed to bean diversity. Yellow-pod or “wax” beans have a tender texture; “Italian” types produce long, flat pods with large seeds; while “French” or filet beans are slender and seldom longer than a pencil.

WHEN TO PLANT

You can plant beans a bit earlier than most cool weather crops, but if the growing bed is too chilly, the seeds will rot before they germinate. Using the straw bale method, it's best to plant beans no earlier than 1 month prior to the average last frost date in your area.

HOW MUCH TO GROW

You can pick bush beans about three times before they're exhausted, whereas pole beans will bear over a period of 2 or 3 months—or even longer with reduced productivity. A bale of pole beans will probably yield 1 pound (450g) of harvest every 2 days in warm summer weather. Each bush bean plant will produce ½ pound (225g) per picking, and the half-runner types, if grown like pole beans, are somewhere in between in terms of productivity.

PESTS AND DISEASES

In North America, the most serious bean pest is the Mexican bean beetle, which you can control by picking them off, spraying them with neem oil, or timing plantings to coincide with low points in the beetle's population cycle. You can control other, less-specialized chewing pests, such as Japanese beetles, by these methods as well.

Beans are subject to a number of viral and fungal diseases, most of which are transferred from plant to plant by insects. Given that beans produce a crop in about 2 months from seed, it's easier to replant than to try to control a disease problem. Many bean varieties will go right on producing despite an infestation.

STARTING YOUR OWN SEEDS

You certainly can start beans indoors and transplant them to the garden using biodegradable pots, but they're so easy to grow from direct seeding that most people avoid the trouble of starting them indoors. Simply press the seeds about 1 inch (2.5cm) into a layer of soil-less growing mix spread on top of the bale with about 2 inches (5cm) between each seed. Come back and thin out every other plant when they have two true leaves.

HARVESTING, STORING, AND PRESERVING

Pick beans frequently to keep the plants productive, and select pods that have reached the size typical for the variety you're planting. This can vary greatly depending upon the cultivar.

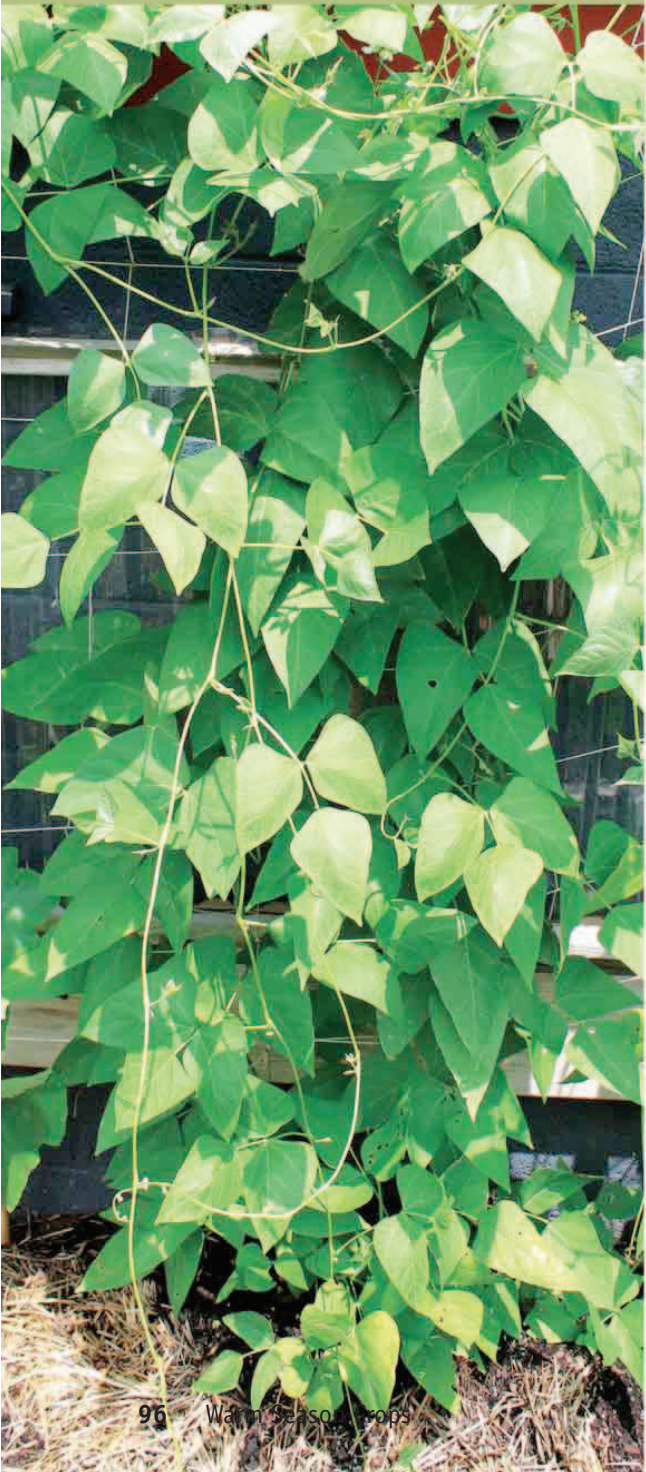
Fresh beans will keep a few days in the refrigerator but are best when eaten the day of harvest. For longer-term storage, trim fresh beans, plunge them into rapidly boiling salted water for 3 minutes to blanch, drain, and plunge them into ice water to stop the cooking and set the color. These beans will keep a week or more in the refrigerator, or you can pack them into freezer containers and freeze for up to 6 months. Or you can can green beans using a pressure cooker. They'll keep for a year or more if properly canned and stored in a cool, dark place.

SPECIAL TIPS

A T-post trellis is insufficient for pole beans. Instead, use a string trellis supported vertically at least 6 feet (1.75m) above the top of your bales.



Bean, Lima



Lima beans are a different species, *Phaseolus lunatus*, from green beans, which are *P. vulgaris*. Lima beans are heat-loving and benefit from the internally generated heat of a straw bale garden. Both bush and pole varieties are available, but for the straw bale grower, the pole variety makes the most sense, as it's far more productive in the same amount of bale space.

WHEN TO PLANT

Plant large lima bean seeds in conditioned bales once the weather is warm and settled—2 weeks or more after the last spring frost date. Provide plants with a sturdy trellis, because they can easily climb to 8 feet (2.5m). Limas can grow large, so sow seeds 6 inches (15.25cm) apart each way—this works out to about 30 plants per bale. Then cover them with about 1 inch (2.5cm) of soil-less growing mix.

HOW MUCH TO GROW

Individual lima bean plants don't yield as many pods as many green bean varieties do. To have a reasonable harvest, you could devote two bales to lima beans. With roughly 60 plants in your garden, you should harvest several pounds of "baby" or green lima beans. If you allow the plants to mature to the dry "butter bean" stage, the weight will be less but when rehydrated and cooked, the beans will produce more servings.

PESTS AND DISEASES

Lima beans are attacked by bean beetles and other pests that infest green beans. You can pick off chewing insects or deter them by spraying the plants with neem oil. Fortunately, lima beans are vigorous plants that can bear a crop despite minor insect damage.

STARTING YOUR OWN SEEDS

If you find it more convenient, you can start lima bean seeds in biodegradable pots and transplant them to the straw bales when they've achieved some growth. Fill the pots with soil-less growing medium, and poke two seeds about 1 inch (2.5cm) deep into each pot. Water well, and expect germination in about 1 week. Move the plants, pot and all, to the straw bales before they begin to climb, an event signaled by the stems twining around each other in search of support.

HARVESTING, STORING, AND PRESERVING

Harvest green, or “baby,” lima beans as soon as the pods have filled out. Check one before harvesting a lot to see if the beans are the size you prefer. If not, wait a few days and check again. In my experience, if the pods begin to show a hint of yellow, it's better to let them mature because the green beans within will be overly starchy at this point.

When the pods have turned yellow and shriveled, and the beans become white or cream-colored with a hardened seed coat, it's time to harvest your mature “butter beans.” Break off the individual pods, and drop them in an old pillowcase. When you've completed the harvest, whack the pillowcase against a convenient wall or tree to shatter the pods and then separate the beans from the debris. You also can shell the beans by hand, if you have the patience or a lot of kids to help.

Green lima beans are best preserved by freezing. Drop them into boiling water for 3 minutes, drain, and plunge them into cold water to stop the cooking and set the color. Pack the blanched limas into freezer containers, and freeze.

Dry lima beans are best stored in jars at room temperature. Keep them bone dry by dropping a small packet of silica gel, such as is often packaged with electronic equipment, into the jar.

SPECIAL TIPS

Lima beans need a long, warm growing season to produce heavily. If you live in a cooler region, your garden space can be better utilized by growing regular green beans, or another crop, and leaving the lima beans to those in warmer zones.



Carrot



Nutritious carrots are among the few vegetables that do well in both cool and warm weather, as long as they receive adequate moisture. Carrots do not require fertile soil; they just need a loose and fluffy growing medium that offers no restraint to the development of long, thick, juicy roots. Straw bales, therefore, are an excellent medium for carrots at any time of the year.

WHEN TO PLANT

Plant carrots as early in the spring as you can plant lettuce in your region. They'll continue to germinate and grow long after lettuce has succumbed to summer's heat, making planting multiple crops in succession a great idea. Carrots can also be planted together with radishes in cool weather.

HOW MUCH TO GROW

A bale of straw has room for about 6 dozen carrots, provided they're spaced on 4-inch (10cm) centers. For best results, choose a carrot variety that produces roots about 6 inches (15.25cm) long, which will be best accommodated in a 2-foot (.5m) deep straw bale.

PESTS AND DISEASES

Carrot root maggots are perhaps the most common pest, but they don't occur everywhere carrots can be grown. Deter them by planting onions or scallions among your carrot plants. The carrot is subject to few diseases.

STARTING YOUR OWN SEEDS

Carrots should never be transplanted because doing so will result in misshapen roots. Instead, direct sow the seeds thinly on a bed of soil-less growing mix, and cover them with barely ¼ inch (.5cm) of fine soil or vermiculite. Keep them well watered, especially at emergence. Seeds may take 3 weeks to germinate, and the seedlings are weak and cannot withstand competition. Thin them to stand 2 inches (5cm) apart each way before they're 3 inches (7.5cm) tall. Make successive plantings all season, up to about 2 months prior to the average last frost date in your area. Most carrots require 70 days from germination to produce a crop.

Many gardeners rely on seed tape to get perfect spacing for carrots. A paper tape with properly spaced carrot seeds imbedded in it, the paper decomposes as the seeds germinate, leaving only minor thinning chores for the gardener.

HARVESTING, STORING, AND PRESERVING

Pull carrots when they've reached the correct color and size typical for the variety. You can leave them in the bale and pull as needed, although if the bale gets too loose from all the disruption, it will be necessary to harvest them all. Fortunately, carrots keep very well.

Rinse off the roots and dry them on kitchen towels or layers of newspaper after cutting off all but 1 inch (2.5cm) of the tops. If you care to use them, the tops are edible and have a strong carrot flavor. Store the prepared roots in plastic bags in the refrigerator. Carrots can be sliced for cooking and either dried in a food dehydrator or blanched for 3 minutes in boiling water, drained, chilled, and frozen in plastic containers. You also can can carrots using a pressure cooker.

SPECIAL TIPS

Besides the familiar orange, carrots come in a variety of colors—red, yellow, white, purple, and purple with an orange center. Roots can be as round as a golf ball or more than 1 foot (30.5cm) long. For “baby” carrots, choose a variety intended for harvest at about the size of your index finger. Early harvests of larger varieties will be disappointingly flavorless.



Chive



The only member of the onion family found in both the Old and New Worlds, chives provide savory onion flavor throughout the growing season. They bloom when conditions are right, and you can use the flowers both in the kitchen and in a vase.

Common chives produce a reddish-purple flower, while garlic chives produce a flat-topped cluster of white blooms. Either is easy to grow from direct sown seed or from divisions of existing plants.

WHEN TO PLANT

Sow chive seeds in soil-less growing mix on a conditioned bale in early spring, about 1 month before the last frost in your area. After they germinate, allow the plants to grow to about 3 inches (7.5cm) tall and thin them to stand about 1 inch (2.5cm) apart. You can re-plant the ones you remove, either elsewhere in straw or in a sunny spot anywhere in the garden.

You also can purchase started chive plants. Simply insert the entire pot in a convenient spot in one of your bales, or break up the clump into smaller pieces. Chives respond well to division. Once you have chives growing, you don't need to repurchase plants or seeds because they'll continue to grow and multiply for years.

HOW MUCH TO GROW

A bale of straw has room enough for all the chives you'll eat. Half a dozen clumps here and there will supply the typical kitchen during the growing season. If you plan to preserve the harvest for winter, grow two or three additional clumps.

PESTS AND DISEASES

Neither common chives nor garlic chives are troubled by insects or disease. They will grow luxuriantly, even under adverse conditions. In the nearly perfect environment of the straw bale garden, chives are effortless to grow.

STARTING YOUR OWN SEEDS

As noted, chives are easy to grow from direct sown seeds, but if you prefer to start clumps and transplant them, that's relatively easy, too. Wait until all danger of frost has passed, or start the seeds indoors under artificial light. Chives do well in moderate light and are a good candidate for artificial light cultivation. Place 3 to 6 seeds in sterile potting mix in a small container. Water well, and expect germination in about a week to 10 days. Feed the young plants with a balanced soluble fertilizer, and transplant them to the garden after 6 weeks of growth. Plant the whole clump; chives tolerate crowding well.

HARVESTING, STORING, AND PRESERVING

Harvest individual chive stems by cutting them at the base with scissors. Snipping off the stem midway down its length will leave an unsightly brown lower half but won't harm the plant. Cut only as much as you require, place the stems cut end down in a glass of water, and use them as soon as possible.

Dehydrated chives lose all flavor. To keep them tasty, snip fresh chives into pieces suitable for cooking. Spoon a small amount into each section of an ice cube tray, cover the chives with water, and freeze overnight. Tip out the cubes, place them in a freezer container, and return to the freezer. You also can make chives into compound butter. Combine snipped chives with softened butter until you have a mixture that looks appetizing. Use about 2 tablespoons fresh chives for every 1 (8-tablespoons) stick butter. Shape the mixture into a log or divide into convenient quantities, wrap well with foil, and freeze.

SPECIAL TIPS

Garlic chive seeds have a high germination rate, and in mild-weather areas of the world, the plant has a tendency to become weedy. Avoid the problem of unwanted seedlings by removing all the flower stems as soon as a few of the individual flowers have opened. (They make excellent cut flowers.) Common chives also may produce viable seeds in your garden, but the germination rate is low and self-sown seedlings appear only occasionally.



Cilantro

Cilantro is a widely used herb, starring in cuisines from all over the world. A member of the large and useful carrot family, it's a very easily grown herb and performs well throughout most of the growing season.



WHEN TO PLANT

Plant cilantro from early spring through late summer. It will grow most vigorously and have the best flavor if planted to mature during cool weather. As the weather heats up, the plants will grow more quickly from seed to flower, at which point the leaves lose much of their culinary appeal. Left to flower, cilantro produces an abundance of seeds, the spice known as coriander.

HOW MUCH TO GROW

If you like cilantro, tuck plants in here and there throughout your straw bale garden wherever you have a bit of space. This herb does not mind sharing the bales with tomatoes and peppers. The presence of the cilantro may also help to deter some insect pests.

PESTS AND DISEASES

Cilantro grows blissfully free of pests and disease and tolerates dry conditions well. When grown in straw bales, it thrives with little extra attention from the gardener.

STARTING YOUR OWN SEEDS

If you, like many cooks, prefer to use all parts of the cilantro plant, roots to leaves, you can plant it in clumps you can simply pull, wash off the roots, and use. To grow cilantro in clumps, start a few seeds in small pots and transplant the entire clump to the straw bale. Fill the pots with the same sterile mix you're using for direct seeding of bales, water well, and plant a half dozen seeds, covering them about ½ inch (1.25cm) deep. Soaking the seeds in water overnight hastens germination. When the plants are a few inches tall, transplant the entire clump to a bale. Remember that you can use the sides and ends of bales for extra growing space.

HARVESTING, STORING, AND PRESERVING

Harvest cilantro when it reaches the size you desire, or after about a month of growth in the straw bale. Snip off individual leaves for garnish, or pull the entire clump, rinse well, and use for dishes such as Thai curry.

It's best to use cilantro the day it's harvested, but you can refrigerate it for a few days. Storage life is increased if the cilantro is left unwashed. Simply wrap freshly harvested plants in newspaper or paper towels, store in a sealed container, and refrigerate. If you've pulled an entire clump, wash off the roots but avoid wetting the leaves.

Cilantro doesn't retain good flavor when dried, but it can be frozen successfully. Chop the cilantro and place portions in an ice cube tray, fill the tray with water, and freeze. Turn out the cubes into a storage container, and return to the freezer. You also can use cilantro instead of basil in butter or pesto sauce and freeze the result in convenient portions.

SPECIAL TIPS

When cilantro goes to seed, it can be difficult to harvest the coriander without scattering the seeds all over the garden. To avoid this, slip a white plastic garbage bag over the entire plant after most of the flowers have produced green seeds. When most of the seeds have matured to brown, cut down the plant at its base and carefully invert it, bag and all. Hang the whole thing up to dry, and the bag will catch the coriander seeds. After drying for 2 weeks, the seeds should be ready to separate from any plant debris. They will keep for months in a cool, dry place.



Collard



Collards have long been associated with the cuisine of the American South, but this vegetable has its origins in the Old World, just like the other members of the large cabbage family. Collards' tolerance for heat and poor soil have earned the plant a place in the traditional cooking of the South, but in recent years, people all over the world have learned to appreciate this nutritious, productive crop.

WHEN TO PLANT

Because the collard plant is tolerant of heat as well as cold, it's an ideal fall crop for many areas. Spring-planted collards mature a crop as the summer heats up, but the flavor is seldom as good as that of plants that mature during cool weather. In the northern hemisphere, sow seeds for collards from mid-July to mid-August. Well-stocked garden centers might offer collards among their fall vegetable plants; they can be relied upon to have plants at the proper time for the local area.

HOW MUCH TO GROW

Collards get large, and two or three plants will fill a bale. Unless you plan on eating them every day, three plants will provide plenty of tasty greens throughout the fall season. You can harvest each several times.

PESTS AND DISEASES

Collards attract the cabbage butterfly (*Pieris rapae*) just like the other members of the cabbage family. *Bacillus thuringiensis* (Bt) dust or spray is an effective control for this pest. Flea beetles, aphids, and slugs can also take a toll. (Control measures for all these pests are discussed elsewhere in the book.) Attempting to grow collards when the temperature is likely to exceed 90°F (32°C) invites pest problems.

STARTING YOUR OWN SEEDS

If you have a bright indoor light source, you can produce your own collards for transplant. Sow the seeds in cell trays or small pots 4 to 6 weeks before you intend to plant them in the straw bale garden. Cover the seeds thinly with potting mix or vermiculite, keep the pots well watered, and expect germination in a week to 10 days. Feed the seedlings with a balanced soluble fertilizer, and keep them growing steadily until they have at least two pairs of true leaves, at which time they will be ready to transplant. The ideal growing temperature for the seedlings is 70°F (21°C).

HARVESTING, STORING, AND PRESERVING

Harvest collards by cutting enough leaves for the use you intend. They're best used the same day but can be rinsed, dried, and stored loosely wrapped in the refrigerator for up to a week.

Collards are most often used as cooked greens. Strip out the tough stems, and chop the leaves coarsely. Cover with water, season, cook over medium heat until tender, and serve as a side dish. Once prepared, cooked greens may be frozen.

Although canning collards in a pressure cooker is another preservation option, because they remain usable into very cold weather, preserving them for long periods of time isn't all that common.

SPECIAL TIPS

Collard is a bold plant with large leaves and makes an eye-catching centerpiece for a decorative bale garden. Surround a single plant with butterhead lettuces and/or beets, and mix in some edible flowers, and your delicious straw bale crops will look as good as they taste.



Corn



Sweet corn on the cob, dripping with butter, or rich and creamy corn chowder are perfect when the corn is freshly picked. Often considered a space monopolizer, corn can now find a place in the straw bale garden, thanks to modern breeding efforts and compact plants that produce as much as their taller cousins. Smaller plants means you can plant them closer together, requiring less room for a decent crop.

WHEN TO PLANT

Corn demands heat and should not be planted, even in a straw bale garden, until the weather is warm and settled. Corn is generally direct seeded. Plant seeds 3 to a spot, spacing them about 8 inches (20.25cm) apart each way. You should be able to get 9 to 12 plants in a single bale. When the seeds have all germinated, remove the two weakest in each spot.

HOW MUCH TO GROW

With proper care, a bale should yield, on average, nine ears of corn. The limit on your production, therefore, is the number of bales you can devote to this single crop. Your garden space may be more suited to a different crop.

PESTS AND DISEASES

Corn is subject to a number of serious pests, depending upon your location. If corn earworms are a problem in your area, you could grow one of the modern hybrids with tightly wrapped ears that are impervious to the caterpillar. Deter generalized insect pests, such as Japanese beetles, with neem oil spray, or remove them by hand.

STARTING YOUR OWN SEEDS

To ensure full germination and proper spacing, you can start corn in small pots and transplant the young plants to the straw bale garden when they're about 6 inches (15.25cm) tall and after the weather is warm enough to start the seeds outdoors. Corn needs more light than you can conveniently supply artificially. Sow two or three seeds in small pots, covering them with about ½ inch (1.25cm) of growing medium, water well, and expect germination in a week to 10 days. Feed with soluble fertilizer as soon as seedlings emerge and weekly thereafter until they're ready to transplant. Thin to the strongest plant after 2 weeks of growth.

Corn smut is a common fungal problem that ruins crops in some regions. The infected ears are considered a delicacy in Mesoamerica. If you're interested in this aspect of corn cultivation, look for more information in your local library or online.

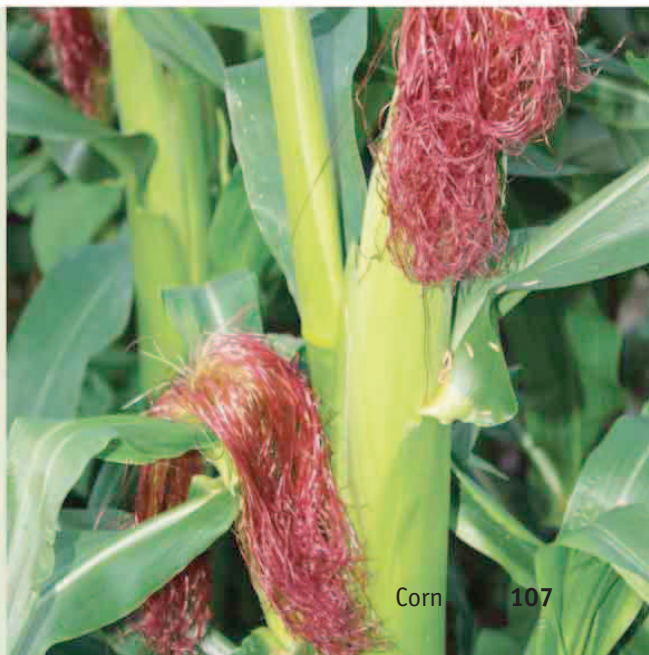
HARVESTING, STORING, AND PRESERVING

Harvest corn when the silks have turned brown. To check if the corn is ready, pull back the husk and pierce a kernel with your thumbnail. The juice that flows out should be milky in appearance and sweet to taste. If it's not, replace the husk and wait a couple more days.

Depending on the variety you grow, freshly picked corn will keep from 1 day to 1 week in the refrigerator. Heirloom varieties will only keep 24 hours without losing flavor. More recently developed varieties produce more sugar than heirlooms do and, consequently, retain their flavor longer in storage.

SPECIAL TIPS

Corn needs heat, nitrogen, and sunshine to produce a crop. Even the excellent growing conditions offered by a straw bale may not be enough to satisfy corn's prodigious appetite for nitrogen. If your stalks begin to look yellow as they reach 1 foot (30.5cm) tall, supplement their diet with a soluble fertilizer with a high nitrogen content. Organic gardeners might want to add a balanced organic fertilizer to the soil-less growing mix prior to planting corn.



Cucumber

Cucumbers are ideal for the backyard garden. A plant or two easily produces all the fresh cucumbers a household might use, and it's easy to preserve any excess cukes for later.



WHEN TO PLANT

Cucumbers like heat, so plant a couple of weeks after your last spring frost. You can buy started plants at a local garden center, or you can grow them by direct seeding. Using prestarted transplants allows you to harvest a crop about 2 weeks earlier than direct sown plants. If your area is subject to late cold snaps, be prepared to protect cucumber foliage from frost with a covering of some sort.

HOW MUCH TO GROW

Cucumbers are grown in groups of two or three plants to ensure pollination. Each of these clumps will take half a straw bale and produce an abundance of cucumbers. Cucumber varieties fall into two distinct groups: those intended for pickling and those intended for fresh eating. The latter, often called “salad” cucumbers, don't pickle well, and the plants aren't as prolific as pickling cucumbers. On the other hand, the pickling varieties are perfectly good to eat fresh. The best bet for your straw bale garden is pickling cukes, which will give you a bigger and more versatile harvest for the same amount of space. Expect about 2 to 4 pounds (1 or 2kg) of cucumbers from each clump of plants.

Allow your cucumbers to sprawl over the bales if you like, but you'll utilize your space better, and make for an easier harvest, if you grow them on a simple string trellis.

PESTS AND DISEASES

Cucumber beetles and squash bugs can be a problem where these insects occur. You can repel both with the use of neem oil spray applied to the plants several times

a week. Squash bugs can be trapped by placing cardboard sheets on the bales at the base of the plants, where the insects hide at night. Inspect the cardboard early in the morning, and sweep the insects into a bucket of soapy water to kill them.

Providing adequate irrigation, especially as fruits are forming, helps reduce problems with cucumbers. Water them daily; the straw will prevent roots from becoming oversaturated.

STARTING YOUR OWN SEEDS

You can successfully transplant cucumbers only if you take great care to ensure you don't disturb their roots in the process. Using biodegradable pots for starting cucumber seeds has made the process virtually foolproof. Biodegradable pots are widely available. Sow five seeds per pot, covering them with a thin layer of potting mix. Water well, and maintain at 70°F (21°C) until the plants have two pairs of true leaves. Remove all but the three strongest plants by pinching them off at the soil line, and transplant pot and all to the straw bale.

HARVESTING, STORING, AND PRESERVING

Harvest cucumbers at the size recommended for the variety you're growing. Cucumbers are best eaten the same day they're picked, but you can hold them for a few days in the refrigerator.

The most common way to preserve cucumbers is by pickling. This can take anywhere from a few hours to a few weeks, and dozens of recipes are available. A quick search online should turn up enough to keep you occupied all season long.

SPECIAL TIPS

At temperatures above 90°F (32°C), cucumber pollen dies, which results in uneven pollination and fruits that might be fat at both ends and thin in the middle. If this happens, remove any misshapen fruits and salvage the usable portions in the kitchen. When the weather returns to cooler temperatures, your cucumbers will return to normal shape.



Dill



A pungent member of the carrot family, dill's uses aren't limited to pickles. The fragrant herb also goes well with many fish, egg, and potato dishes, and it has an affinity for tomatoes, too. Dill is easy to grow and can add a decorative element to your straw bale garden with its large umbels of greenish-yellow flowers. The blooms also help attract pollinators to your garden.

WHEN TO PLANT

Plant dill at the same time you plant cucumbers. The dill will bloom as the cucumber flowers open, increasing the likelihood of pollination. Many gardeners feel dill helps repel pests from both cucumbers and tomatoes. It certainly doesn't hurt, and the dill itself doesn't mind competition from other vegetables.

Dill seeds sown around the frost date will bloom about 90 days later. In areas with a long growing season, you can plant dill successively until midsummer.

HOW MUCH TO GROW

You can plant dill here and there in your straw bale garden, wherever you have a little space. Don't forget to utilize the sides and ends of the bales for crops such as dill. If you plan on frequent use of the leaves, fit in as many clumps as you can. If you want the flowers and seeds, you need to allow the plants enough room to grow and mature. For most households, two or three dill plants should be sufficient.

PESTS AND DISEASES

Dill can actually help repel certain insects, such as cucumber beetles, and is often interplanted among other crops. About the only creature you might find feeding on your dill plants is the large, colorful caterpillar of the black swallowtail butterfly, otherwise known as a parsley worm. Given the increasing rarity of all types of butterflies, it's better to leave the dill to the caterpillars and replant again later in the season.

STARTING YOUR OWN SEEDS

Dill can easily be direct seeded on bales. To have the earliest possible harvest, you can start seeds indoors in small pots and transplant to the bales. Scatter seeds on the surface of a soil-less growing mix and cover thinly with vermiculite. The seedlings are weak so don't cover them too deeply or germination will be poor. Water the pots, and keep them at 70°F (21°C). Germination can take up to a month. When the seedlings appear, feed them with a balanced soluble fertilizer at half the recommended strength. Transplant to the straw bale any time after true leaves are evident. Avoid disturbing the roots as much as possible during transplantation.

HARVESTING, STORING, AND PRESERVING

Harvest dill foliage as needed. Use mature seed heads immediately to flavor pickles, or store the seeds for future use.

Dried dill foliage, known as dill weed, holds its flavor well. Use a food dehydrator or simply bind bunches of stems with rubber bands and hang them to dry in a warm, airy place. Store dried dill weed or seeds in warm, dry conditions.

You also can capture dill flavor in oil or vinegar by steeping the seeds and foliage in the liquid. Look online or in preserving books for specific recipes.

SPECIAL TIPS

Unless you make a lot of dill pickles, you'll probably have enough dill flowers to permit saving seed. Doing so is easy. Wait until all the seeds in the head have lost any green coloration, clip off the entire head with scissors, and place it in a brown paper bag. Close the top of the bag by folding it over a time or two, and place it in a warm, dry place for 2 weeks. By the end of this time, the seeds should have come loose from the head. Store them for use in the kitchen or for starting more plants next year.



Edible Flowers

Edible flowers bring a spot of color not only to your garden but also to your plate. These blooming bites make tasty additions to salads and attractive garnishes for any plate.



WHEN TO PLANT

Like vegetables, edible flowers come in both warm season and cool season varieties. Among the more reliable cool season ones are calendula, dianthus, and violas. Warm season varieties include nasturtiums, marigolds, and the flowers of annual and perennial herbs. You can use any of these to add color, interest, and flavor to the straw bale garden.

Plant cool season flowers at the same time you plant lettuce, up to a month prior to the last spring frost in your area. Violas in particular can tolerate cold, and the self-generated warmth of the straw bale protects all the plants from late cold snaps. Warm season flowers can go into the straw bale about a month before the summer solstice in most areas.

These flowers will likely be available in garden centers during much of your spring season, so you'll have plenty of leeway in selecting an appropriate planting time.

HOW MUCH TO GROW

I suggest filling any available space not already taken by annual herbs or vegetables with an edible flower plant. Not only does this maximize your use of the growing space, but it also does much to distract from the utilitarian appearance of the straw bale garden.

PESTS AND DISEASES

Edible flowers are subject to the depredations of generalized pests, such as aphids, Japanese beetles, and slugs. The same control suggestions for vegetable crops apply to edible flower plants.

STARTING YOUR OWN SEEDS

You can start the vast majority of edible annual flowers indoors a month prior to setting them in the straw bales. For cool season flowers, the indoor growing temperature should be 60°F to 65°F (15.5°C to 18°C). For warm season flowers, the temperature can be about 68°F (20°C) or a bit warmer. Sow all flower seeds thinly in small pots, and cover with growing mix or vermiculite. Planting depth will vary with the size of the seed. Follow the package recommendations, or cover seeds no deeper than twice their diameter. Water well, and expect germination in 1 to 3 weeks, depending on the variety.

HARVESTING, STORING, AND PRESERVING

Harvest edible flowers as needed; few keep for more than 24 hours after picking. You can preserve flowers in several ways. The simplest approach is to place them in an airtight container and cover them completely with sugar. The flowers will infuse the sugar with their color and fragrance, and some will even retain their shape. You also can paint individual flowers, such as violas, with egg white, dip them in sugar, and use them to decorate cakes and confections.

Various flowers, including nasturtiums and marigolds, can be preserved in vinegar. Cover 1 cup fresh flowers with 2 cups rice or white wine vinegar, and refrigerate for 2 weeks. Decant the vinegar, and bottle, adding a single flower to the container for decoration. Store the flavored vinegar in the refrigerator for up to 6 months.

SPECIAL TIPS

Savvy seed purveyors know that some gardeners look for edible flowers. As a result, they offer seeds that produce flowers of particularly fine flavor or with other desirable culinary characteristics. These varieties are worth seeking out if you're prepared to start your own plants from seeds.



Eggplant



Eggplant—or aubergine, as it’s known in Europe—makes a great substitute for meat in certain dishes, and it’s easy to grow where summers are long and warm. Besides the conventional pear-shaped dark purple fruits, you can grow white, orange, green, or multicolor eggplants in an array of shapes, from globular to elongated. All the different varieties are grown the same way, however, and differ only in their maturity times.

WHEN TO PLANT

Wait until the weather is warm and settled, about a month after the last spring frost, before moving eggplant plants into your straw bale garden. Eggplants can tolerate cooler temperatures and resume growth later, but a bit of cold stress is often enough to precipitate an infestation of flea beetles. Where these insects occur, planting eggplant too early is a near guarantee of failure.

HOW MUCH TO GROW

Most eggplant varieties produce several pounds of fruit over the course of the season. The number of individual fruits largely depends on their mature size. For example, varieties intended for “baby” eggplants, maturing at 3 or 4 inches (7.5 to 10cm) produce several dozen fruits, while those producing large, pear-shaped fruits may only yield three fruits.

A straw bale will accommodate two eggplants, enough for the average family of four.

PESTS AND DISEASES

Eggplants are particularly attractive to flea beetles in some locations where these beetles occur, and the only sure way to avoid these pests is to cover the plants with

a protective cloth until blooms appear. Eggplants also develop problems related to soil-borne fungi, and for this reason, they do much better in straw bales than if grown directly in the ground.

Tomato hornworm caterpillars can be a problem in some locations, and nonspecific chewing insects such as Japanese beetles may attack eggplants.

STARTING YOUR OWN SEEDS

You can grow your own eggplant transplants if you have a suitable indoor light source. Use small pots filled with soil-less growing mix, and sow two or three seeds in each pot, burying them just below the surface. Water well, keep the pots at a minimum temperature of 65°F (18°C), and expect them to germinate within 2 weeks. When true leaves appear, feed with a soluble balanced fertilizer. Feed again in 2 weeks. The plants should be ready to transplant after a month of growth.

HARVESTING, STORING, AND PRESERVING

Harvest eggplant when they reach the mature size for the variety you're growing. Fruits will change from green to purple or another color when they're ready. When in doubt, harvest early. Eggplants that are too small are still usable, but overly mature fruits tend to be bitter and contain too much water. They'll cook down to mush in some recipes.

Eggplants keep about a week in the refrigerator, but it's best to use the fruits on the same day you harvest them.

Breaded, deep-fried slices of eggplant can be drained well, transferred to a baking sheet lined with waxed paper, and frozen overnight. Remove the frozen slices from the baking sheet and store in plastic freezer bags, separating the slices with a small square of waxed paper. This method is the only reliable one for a home kitchen.

To bread the slices, dip them first into flour, then into beaten egg, and finally into bread crumbs. Place the coated slices on a rack to dry for at least 30 minutes before deep frying.

It is possible to dehydrate slices of eggplant using a food dehydrator, but other means of preservation yield less-than-satisfactory results. Most people enjoy eggplant during its summer season and wait until the next year for more.

SPECIAL TIPS

Because straw bales generate internal heat, you can plant eggplant early in the season without damage ... but they might just sit there until the air temperature is above 60°F (15.5°C) at night.



Garlic



Garlic appears in most cuisines of the world, and few cooks would want to be deprived of the pungent, savory flavor of garlic. Garlic might not be the ideal straw bale plant—it grows well no matter what—but it can, nevertheless, be included in your straw bale garden if you have a long growing season of 175 days or more.

WHEN TO PLANT

Garlic is started from the individual cloves separated from the bulb. Press the cloves into a conditioned straw bale as early in spring as you can. The actual time to maturity depends on multiple factors, including the genetics of the seed garlic strain and the weather in your region. Plant your garlic as early as possible, give it the maximum time to grow, and hope for the best. Even immature garlic is usable.

HOW MUCH TO GROW

Plant as much garlic as you can fit in among other crops. Until you know if garlic will do well in your climate and location, it's best not to devote an entire bale to the crop. If you do, a bale will easily handle about 5 dozen garlic cloves and yield a sizeable number of bulbs, if the season is sufficiently long.

PESTS AND DISEASES

Garlic is subject to several soil-borne diseases, but you avoid these in straw bale gardens. Pest insects are rare. In fact, garlic can be used as a companion crop to help deter bugs from other plants, such as carrots. For this reason alone, it's worth growing.

STARTING YOUR OWN SEEDS

Garlic is never grown from seed, and there's no reason to start cloves early and move them to the garden. If garlic does poorly in your straw bale garden, it's probably wise to devote the space to another crop instead.

HARVESTING, STORING, AND PRESERVING

Prior to maturation, at least some portion of your garlic plants may send up a bloom, or a scape. Remove scapes all the way to the base of their stem. These can be used in stir-fries or soups in much the same way you might use leeks. The flowers themselves have a particularly good flavor, too.

Assuming conditions are right for garlic to mature in your garden, expect the stalks of spring-planted plants to begin to turn yellow when they're ready to harvest. In warm climates, this may occur shortly after the summer solstice. In cooler areas, the maturation time will be somewhat longer. But in all cases, the plants will signal their approaching dormancy by yellowing. When two thirds of your plants are showing some yellow, pull them all. Place them in a dry, shaded location for a week to cure, remove the tops, and store the bulbs in baskets or boxes. Or braid the tops and hang them in a warm, airy place. Garlic remains fresh for at least 6 months if properly dried and stored after harvest.

SPECIAL TIPS

For a first attempt, purchase your garlic at the grocery store. This gives you a chance to see how garlic does in your region without the investment in seed cloves of named varieties, which are often expensive. As long as the cloves are sound and not discolored, they should sprout when planted and watered.



Melon



Melons are members of the same botanical family as squashes and cucumbers and enjoy a similar long, lush growing season in sunny warmth. Many traditional melon cultivars are too rambunctious for gardens with limited space, but compact-growing varieties have been developed that enable melons to be easy for backyard gardeners.

WHEN TO PLANT

Melons need a long, warm, wet growing season and should not be attempted where these conditions are absent. You can extend the season by about a month if you start seeds early with a sufficiently bright indoor lighting arrangement. More and more garden centers have begun to offer melon seedlings in biodegradable pots, and these would be the first choice for an inexperienced grower. Transplant the potted plants to straw bales about 2 weeks after the last frost date in your area. Wait until that time to sow seeds directly. Using a soil-less planting mix, place only two groups of seeds per bale, three to five seeds per spot. When all the plants have true leaves, thin out all but the two strongest plants in each spot.

HOW MUCH TO GROW

A bale of smaller-fruited melons, such as cantaloupe, probably yields five nice melons. Larger-fruited varieties, such as watermelons, might only give you one or two nice fruits.

PESTS AND DISEASES

Nonspecific chewing pests and squash bugs are melons' primary enemies. In addition to physical damage, squash bugs and their related sucking insects, such as aphids, transmit diseases from plant to plant. Melons, like other

squashes and gourds, are subject to a number of fungal and viral pathogens—some of which are likely incurable. Learn what grows well for others in your immediate vicinity, and copy their efforts. Straw bale gardeners have an advantage, as the ideal growing conditions provided by bales encourage healthy, disease-free plants.

STARTING YOUR OWN SEEDS

You can start melon seeds in biodegradable pots and transplant them to the straw bales when they've achieved some growth. Fill the pots with soil-less growing medium, and sow three seeds ½ inch (1.25cm) deep in each pot. Water well, and expect germination in about 2 or 3 weeks. Thin to two plants per pot when true leaves appear. Move the plants, pot and all, to the straw bales when they have two or three pairs of true leaves.

HARVESTING, STORING, AND PRESERVING

Determining the proper harvest time for melons is an art form in some circles, but there are a few reliable guidelines.

For cantaloupe, muskmelon, charentais, and honeydew types, the ripe melons will slip from the vine when the fruit is ready to pick. The blossom end will yield to slight pressure, and the fruit will have a nice, appropriate fragrance. An aroma of acetone or alcohol, or softness of the skin, indicates an overripe fruit.

Judging the ripeness of watermelon is a bit trickier. Some people thump the melon with a finger and listen for a distinctive, hollow sound to determine ripeness. A more practical way is to use the days to maturity the seed company suggests as a guide. Make note of the transplant date, and count the days to maturity from that point. This should give you a good chance of harvesting a sweet, succulent watermelon.

SPECIAL TIPS

All melons take up considerably less space in the garden when grown vertically on a trellis. Some varieties need a little extra help from you to utilize a trellis, while others climb easily. If you need to tie up melon vines, handle them carefully and use soft ties made from strips of cloth to avoid damage. Support developing melon fruits separately with hammocks made from wide cloth strips secured to the trellis supports. Otherwise, fruits may become so heavy they drop from the vine.



Okra



Okra has long been associated with the American South, but it actually has African origins. Where the growing season is sufficiently long to produce a crop, okra endears itself to gardeners with its tolerance of poor soil; drought; and hot, humid weather.

WHEN TO PLANT

Okra dislikes cold and should not be planted if there's a chance the nighttime temperature will drop below 60°F (15.5°C). This is the primary reason people living at some latitudes cannot grow this crop—not enough time and warm weather for the plant to mature. Starting seeds indoors in pots stretches out the season a month, with the internally generated heat of straw bales contributing to season extension. Direct sow seeds in a soil-less growing mix, placing them in groups about 1 foot (30.5cm) apart each way, and cover to a depth of ½ inch (1.25cm). Thin to one plant per spot when all plants have true leaves.

HOW MUCH TO GROW

Okra fans will want tons of it, but others might find okra an acquired taste. Start with a single bale, which should hold four to six plants, depending on the size of the cultivar you choose. A compact variety is your best bet. Any variety of okra will keep bearing pods until a frost. Most compact varieties begin bearing after 65 days of growth. In a good season, you can harvest an abundance from even a small patch.

PESTS AND DISEASES

Insects and disease are seldom responsible for a failed okra crop; deer and groundhogs are more often to blame. Young plants may be attacked by slugs, and nonspecific chewing insects may nibble, but these seldom do significant damage

STARTING YOUR OWN SEEDS

For the relatively small number of plants needed for a straw bale garden, you might want to start okra indoors. Provide bright artificial light, and grow the plants at a minimum temperature of 65°F (18°C). Sow two or three seeds in small pots of soil-less growing medium, placing them about ½ inch (1.25cm) deep. Soak the seeds in water to cover for a day or two before planting to speed germination. Expect plants to emerge in 1 or 2 weeks. Feed them at emergence and again 2 weeks later with a balanced soluble fertilizer mixed with water according to the package directions. Transplant the plants to bales when they have at least two pairs of true leaves.

HARVESTING, STORING, AND PRESERVING

Harvest okra every day once the pods begin to appear. For most varieties, the best pods are about 3 inches (7.5cm) long, although in others, the pods can grow much longer without loss of quality. Cut off each pod with a little bit of stem still attached. This prevents the sticky sap from oozing out and also slows pod dehydration.

Store okra for a maximum of 2 or 3 days in the refrigerator. If brown spots appear, use the okra at once or discard it.

Okra can be preserved by pickling or pressure cooking, but the easiest method is to freeze whole pods in freezer containers. Thaw the pods, cut, and use the same as fresh okra.

Do not wash okra. This increases the production of complex carbohydrates that impart a slimy texture to some dishes. Instead, wipe pods clean with a dry kitchen towel.

SPECIAL TIPS

Okra must be picked regularly to keep the pods coming on. If you accidentally leave a pod on the plant to mature, the plant's overall productivity will be drastically reduced. To help avoid this mistake, some okra produces bright red pods that are hard to miss when you're picking.



Onion



The onion, known to cuisines all over the world, comes in numerous varieties you can tuck into otherwise unoccupied spots in your straw bale garden. Or you can grow onions by the full bale. You can use your crop fresh or store them for later.

WHEN TO PLANT

Most onions are day-length sensitive, meaning the timing of bulb formation is based on the length of the day. Short day onions produce a bulb during the declining daylight hours of fall and winter, while long day onions form bulbs as the days lengthen in spring. This difference is crucial, as onions planted at the wrong time of year won't produce bulbs. As a general rule, in North America, where winters are sufficiently mild to allow them to overwinter—typically USDA Zone 8 or warmer—plant short day onions in the fall. In higher latitudes, plant long day varieties in early spring, about a month before the last frost, for a harvest around the summer solstice.

Onions are typically grown from small bulbs, or sets, produced commercially from seed. You also might find onion plants, which look like small scallions, available for transplant. The choice is yours. Just be sure the variety is appropriate for your region.

To plant, simply stick the set in a conditioned bale, leaving the top exposed to the sun. If you use plants, bury them in the bale until the white part is covered. Thereafter, your onions should require only routine care.

HOW MUCH TO GROW

It's hard to have too many onions. If properly grown, harvested, and stored, you can grow enough to last year round. Nevertheless, space limitations dictate the size of your crop. Large storage onions can be grown at a density of about a dozen per straw bale.

PESTS AND DISEASES

Diseases, which are transmitted in the soil, are not a problem for onions grown in straw bales. Onions are seldom beset by insects, likely because their pungent aroma and savory flavor deters munching insects. Centuries of selective breeding have produced onions much milder and sweeter than their wild ancestors are likely to have been.

STARTING YOUR OWN SEEDS

It's not practical to start onions from seed.

HARVESTING, STORING, AND PRESERVING

Onions are ready to harvest when the tops turn yellow and begin to fall over. Wait until about two thirds of your crop shows these signs, and pull them all. Remove any excess debris clinging to the roots, and lay the onions on a flat surface in a dry, shaded, airy spot. Leave them to cure for a week or two, or until the stalks are dry and papery. At this point, you can cut the stalks and store the onion bulbs in a single layer in shallow baskets or cardboard boxes, or braid the stalks and hang them in a cool, dry place out of the sun.

Because moisture encourages sprouting and rot, store onions at low humidity and normal room temperature. Storing bulbs so air can circulate around them helps keep them dry and sound. Check stored onions regularly, and immediately remove and use or discard those that show signs of damage or rot.

Chopped onions keep better and lose some of their harshness if they're soaked in hot (not boiling) water for 30 seconds before use. To freeze onions, prepare for cooking, chop coarsely, and drop into boiling water for 30 seconds. Drain well, and plunge into cold water to stop the cooking. Pack the blanched onions into appropriate containers, and freeze.

SPECIAL TIPS

Recent advances in plant breeding have led to onion varieties that are “day neutral.” These types produce a bulb regardless of the length of the day and can be planted at any time of year that will afford a sufficiently long growing season for bulbs to develop. When in doubt about what variety you should plant, seek out day neutral onions online or in nursery catalogs.



Parsley



Parsley offers the gift of harvest at almost any season. Plants can go outside prior to the frost date, and you can make plantings in succession all summer for a continuous crop. Long after everything else has been harvested in fall, parsley remains green until the first hard freeze.

WHEN TO PLANT

Transplant parsley plants from your local garden center about a month before the last spring frost. They'll benefit from the added heat provided by straw bales. You can continue planting up until about a month before your first fall frost. Expect new transplants to be ready for a light harvest after 3 weeks of growth.

Choose your parsley variety based on the anticipated weather. When temperatures are on the cooler side, plant curly leaf varieties that are more tolerant of cold. If your area is prone to hot weather, opt for a flat leaf variety to produce a better-quality crop. Care for either is the same.

HOW MUCH TO GROW

Tuck several plants here and there into your straw bales, and rotate your harvest among them. Harvesting too early or too often from a single plant could cause it to go to seed, or bolt, prematurely.

On the other hand, unless you need a massive amount of parsley for some special purpose, you don't have to devote an entire bale to the crop. Parsley is a great choice for planting in the sides and ends of bales, and it gets along well with most other crops.

PESTS AND DISEASES

Parsley worms, the larvae of the black swallowtail butterfly, display a remarkable ability to zero in on parsley plants in areas where the insect occurs. The caterpillar, brightly marked in green, yellow, and black, can strip the leaves from your plants in short order. If you're concerned about declining butterfly populations, leave them alone. The plants will recover after the worms are done. Few other creatures attack parsley. Nonspecific munchers such as snails and slugs are the primary threat.

STARTING YOUR OWN SEEDS

Parsley is easy to start indoors from seed, provided you have a suitable light source. Germination can be slow, but you can speed it up by soaking seeds in lukewarm water overnight before planting. Strain the seeds through a tea strainer, and soak again for 2 more days, straining them each time and replacing them in fresh water. After straining the seeds on the fourth day, sow them in small pots, covering with a thin layer of vermiculite or potting mix. Expect germination in about a week. Without pretreatment, germination can require 3 weeks to 1 month.

Keep seedlings well watered, and feed them with a balanced soluble fertilizer at emergence and again 2 weeks later. They'll be ready for the straw bales after a month of growth.

HARVESTING, STORING, AND PRESERVING

Harvest parsley as needed. Cut the entire leaf down to its base to prevent unsightly yellowing of partially cut leaf stalks. Freshly cut parsley keeps a day or two if placed upright in a glass of water, like a bouquet of flowers. For longer storage, rinse the leaves, shake off most of the water, and wrap loosely in paper towels. Place the bundle in an airtight container, and refrigerate for up to a week.

Dehydrated parsley develops a distinctly grasslike flavor. Freezing in ice cube trays works best. Snip the parsley into pieces suitable for cooking, spoon a small amount into each section of an ice cube tray, cover with water, and freeze overnight. Tip out the cubes, place them in a freezer container, and return to the freezer. Or you can make parsley butter by mixing 1 ounce (25g) finely minced leaves with 4 ounces (110g) softened butter. Combine well, form the butter into a log, wrap in aluminum foil, and freeze. Other condiments combining parsley with fat, such as Italian-style pesto, also freeze well.

SPECIAL TIPS

Parsley tolerates shade very well and doesn't mind if taller plants, such as okra, tower above. This herb is ideal as a fill-in you can use to maximize the space in your straw bale garden.



Pepper, Hot



Hot peppers add a kick to a dish and are key ingredients in cuisines from Asia to the Mediterranean to the American Southwest. All this interest in capsaicin, the source of the pepper's heat, has resulted in the development of countless cultivated forms, all either selections or hybrids of the several species of wild peppers. Some are natives of the New World; others are found in Asia.

WHEN TO PLANT

All peppers prefer warmth, although ironically, many suffer when the temperature soars above 90°F (32°C). Wait until the weather is warm and settled before putting out pepper transplants. Aim for a month after your last spring frost, despite the promise of added heat from the straw bales. This avoids any possible setback during the early stages of growth, from which peppers seldom completely recover.

HOW MUCH TO GROW

Depending on the size of individual plants, you can place between two and four hot peppers in a single straw bale. For example, Anaheim chile peppers reach about 4 feet (1.25m) tall, while many varieties of tiny Thai chiles grow barely 1 foot (30.5cm) tall. Most other varieties fall between these two extremes.

Hot peppers vary widely in their productivity. As a general rule, the larger the plant, the fewer fruits produced, but notable exceptions exist. Cayenne peppers—which produce long, slender, wrinkled fruits—typically yield hundreds on plants 4 feet (1.25m) tall. A similar-sized Anaheim might only produce 30 chiles.

Consider how you plan to use hot peppers before you buy and plant any. If you want to add heat to dishes

throughout the year, grow a small, thin-skinned variety that's easy to dry for later use. If you prefer fresh peppers, opt for a heftier type such as the jalapeño.

PESTS AND DISEASES

Hot peppers are subject to foliar blights and viruses that plague other members of the tomato family. However, these are much reduced when growing peppers in straw bales. Nonspecific chewing insects can attack peppers if they're stressed, such as by a late cold snap. For the most part, peppers are generally trouble free.

STARTING YOUR OWN SEEDS

Peppers are easy to start indoors from seed, provided you have a very bright light source. Sow seeds in small pots, three to a pot, burying them just beneath the surface. Water well, and keep them between 70°F and 80°F (21°C and 26.5°C)—warmth is critical at this stage. Water the seedlings, which emerge in 2 or 3 weeks, with lukewarm water. Don't let them wilt, and protect them from cold drafts. Plants seldom recover from setbacks at this stage. When true leaves appear on all plants, snip off the two weaker ones in each pot. Wait until at least two pairs of true leaves are present before transplanting.

If the weather is too cool when you're ready to transplant, repot the peppers in larger containers to await better conditions.

HARVESTING, STORING, AND PRESERVING

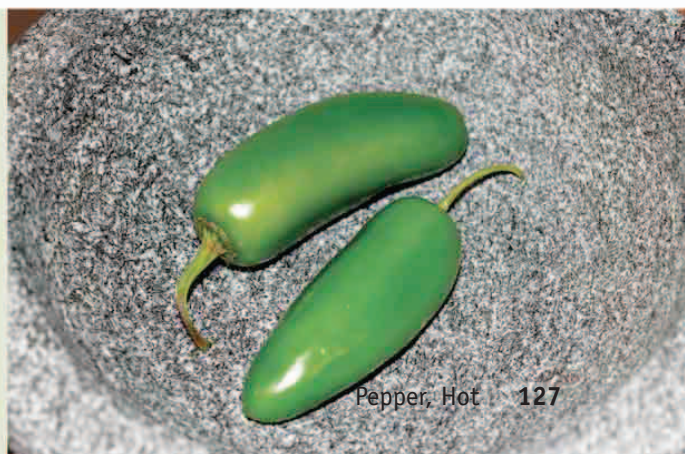
Most hot peppers begin developing heat as soon as the fruits have formed. You can harvest them at any stage thereafter. Some varieties, such as cayenne, hang on the plant until they shrivel and dry, while others might rot if not harvested. All get hotter, and more nutritious, as they ripen.

Freshly picked peppers keep about a week when refrigerated in a closed container to prevent them drying out. Peppers that dry easily on the plant can be harvested, spread out on newspapers to dry thoroughly indoors, and stored in screw-top jars. Add a packet of silica gel to keep the interior of the jar dry. Use a very low-heat oven or a food dehydrator to dry larger peppers. Air drying is only successful in arid regions.

Hot peppers freeze easily, too. Trim the peppers, drop them into containers, and freeze.

SPECIAL TIPS

Even small pepper plants can benefit from support, especially when the branches are laden with peppers. Use a small wire tomato cage to surround and support each plant.



Pepper, Sweet



Freshly picked sweet peppers are one of summer's true delights. Ranging from never-fail banana peppers to the somewhat more finicky bell peppers and pimentos, sweet peppers bear abundantly and over a long season when they're grown well.

WHEN TO PLANT

Peppers of all types love warmth, so wait until the weather is settled—a month after your last frost date—before planting. Most varieties of sweet peppers begin bearing usable fruits about 90 days after transplanting. Ripe fruits require another month to properly develop their color. Using plants started early in the season in a greenhouse is your best bet, or you can start your own if you have a suitable indoor space.

Peppers are often sold in biodegradable pots to minimize root disturbance. Be sure you bury the entire pot in the straw bale, surrounding it with additional soil-less growing mix if necessary. If you allow the rim of the pot to protrude from the growing medium, it will wick water away from the plant roots.

HOW MUCH TO GROW

Most bell pepper plants are roughly the size of a compact-growing tomato, and two fit in a single straw bale. Pimento and banana peppers are smaller; you should be able to fit four of these smaller plants in one bale. Peppers actually like a little crowding because it increases the amount of humidity around the plants, facilitating pollination.

PESTS AND DISEASES

If you find a big caterpillar munching on your peppers, hand removal is the most prudent way to deal with it.

STARTING YOUR OWN SEEDS

You need a bright light source and a warm indoor location to start peppers, but they grow easily in containers. Sow seeds in small pots, three to a pot, burying the seeds just beneath the surface. Water well and keep the pots between 70°F and 80°F (21°C and 26.5°C). Warmth is critical at this stage. Seedlings will emerge in 2 or 3 weeks; water them with lukewarm water. Do not permit them to wilt, and protect them from cold drafts so they don't suffer any setbacks. When true leaves appear on all plants, snip off the two weaker ones in each pot. Wait until at least two pairs of true leaves are present before transplanting the peppers to straw bales.

If the weather is still too cool when you're ready to transplant, move the pepper plants to larger containers where they can await better conditions outside.

HARVESTING, STORING, AND PRESERVING

You can harvest sweet peppers at any stage, from green to ripe. They'll be sweeter and richer in nutrients when they ripen, but they're still edible at any stage. You can keep freshly harvested peppers in the refrigerator for up to a week, but they're best if used immediately.

The easiest way to preserve sweet peppers is to freeze them. Simply core and trim the peppers, place them in suitable containers, and freeze. Or spread chopped or sliced peppers on a baking sheet covered with waxed paper, and freeze overnight. Scrape the frozen peppers into a storage container, and freeze. When you're ready to cook, remove only as many chopped or sliced peppers as you need for the recipe and return the rest to the freezer.

Peppers are ideal for pickling and transforming into relishes. Dozens of recipes are available in cookbooks and online. Rinse pickled peppers and add them to cooked dishes as though they were freshly harvested.

SPECIAL TIPS

Always provide a cage for peppers to lend support to the branches when fruits begin to form. Otherwise, those types with larger peppers will break under the weight of their fruits. If you want to avoid this problem while producing the largest possible fruits, thin fruits when they're the size of a golf ball. This limits each branch to only two or three well-spaced peppers.



Potato, Sweet



The sweet potato, a member of the morning glory family, requires a long, warm growing season. It also needs space, so in your straw bale garden, give sweet potatoes a place of their own where the vigorous vines can run all over. Or choose a compact variety if they're available in your area.

WHEN TO PLANT

Sweet potatoes are started from small plants, or slips, produced commercially. Order plants to arrive about a month after the last frost in your area, and be prepared to protect young sweet potatoes from late cold snaps if such events are common in your location.

HOW MUCH TO GROW

Arranging four bales to make a square bed just for sweet potatoes in a part of the garden separates these spreading spuds and prevents the aggressive sweet potatoes from interfering with your other plants. Because they like heat and loose, friable soil, sweet potatoes produce abundantly in straw bales. After conditioning, plant one vine in the middle of each bale. The vines will completely enclose the straw in about 2 months. Four bales should provide enough potatoes to last for about 4 months after the end of the growing season.

PESTS AND DISEASES

Sweet potatoes are remarkably free of pests and diseases. Nonspecific chewing insects, such as Japanese beetles, may occasionally infest the vines, but you can pick them off by hand or repel them with neem oil spray.

Avoid virus diseases by purchasing sweet potato plants from commercial growers, or start your own slips if you know your garden is disease free. With the straw bale garden method, it's unlikely you'll have disease issues.

STARTING YOUR OWN SEEDS

Sweet potatoes aren't started from seeds; typically, to preserve the characteristics of a particular cultivar, new plants are begun from the stored roots of last year's crop. To start your own, you need to begin about 3 months prior to the time you want plants ready to go into the bales.

Choose a healthy-looking root from among your stored sweet potatoes, or purchase a potato at the grocery store. Select a jar large enough to hold the sweet potato upright without tipping, and fill the jar with about 1 inch (2.5cm) of water. Stand the sweet potato on end with the lower end submerged, and place the jar in a warm, sunny location. It may take 2 months before plants begin to grow from the eyes on the root. Check your potato frequently, and maintain the water level in the jar.

As the plants emerge from the root, they'll produce new white feeding roots of their own. When these feeding roots are about 3 inches (7.5cm) long, carefully detach the plants from the root and pot them in soil-less growing mix. When they have several pairs of leaves, transplant them to straw bales.

HARVESTING, STORING, AND PRESERVING

Leave sweet potatoes in their bales until frost threatens. If frost damages the leaves, the keeping quality of the roots will be diminished. Err on the side of early harvest—typically about 120 days from transplanting. To harvest, pull the plants from the bales and cut off the foliage. If necessary, break open the bales to remove all the roots that are larger in diameter than your finger.

Spread the roots on newspaper in a warm, dry, shady location to cure for a week, and store them in baskets in a dark, dry place. Do not store sweet potatoes in the refrigerator. Check the potatoes regularly and discard or immediately use any roots that show signs of decay.

Dry storage is the most common method of preservation for sweet potatoes. You also can freeze or can cooked and mashed sweet potatoes.

SPECIAL TIPS

Not all sweet potatoes are bright yellow-orange. Some have creamy white to yellow flesh. The lighter-colored varieties are less sweet than the orange ones, and many people prefer their chestnutlike flavor. Another sweet potato variety has purple flesh with a drier consistency and medium sweetness.



Pumpkin



The pumpkin is a gourd, related to squashes, melons, and cucumbers. Generally speaking, there are two basic types of pumpkins: the smaller, sweeter “pie” pumpkins and larger—even enormous—ones, used mostly for carving jack-o’-lanterns. Pie pumpkins are best for straw bale gardens.

WHEN TO PLANT

Pumpkins require a long, warm growing season of about 120 days after germination. Wait until the weather is warm and settled in your area, but not so long you allow too little time for pumpkins to mature. You can gain a month on the season by starting seeds indoors. Or purchase started plants in biodegradable pots. If your region is subject to late cold snaps, be prepared to protect the young plants from cold.

HOW MUCH TO GROW

Depending on the variety, two or three pumpkin plants in a single bale will likely produce a sufficient number of fruits for pies in the fall and winter. Expect three fruits from three plants if they’re the larger pie pumpkins more than 6 inches (15.25cm) in diameter. For the smaller-fruited varieties that have become available in recent years, you can expect six to nine fruits from three plants.

PESTS AND DISEASES

Squash bugs, squash vine borers, and various fungal diseases may attack pumpkins. Squash vine borers are limited geographically. In some locations, they make growing gourds impossible without a fine net covering over the plants. Squash bugs damage fruits and transmit diseases and are best dealt with by spraying plants and

fruits with neem oil. Neem may cause the skin of the pumpkins to discolor, but this is superficial damage and doesn't impair the cooking quality.

Among fungal diseases, the only one likely in a straw bale garden is powdery mildew on the leaves. You can control this with neem oil spray, too. It's less of a problem if the plants are grown vertically on a trellis.

STARTING YOUR OWN SEEDS

Pumpkin seeds are easy to start indoors if you have a suitably bright light source. Many gardeners start them outdoors in late spring and bring them indoors at night.

Either way, sow three seeds each in biodegradable pots filled with soil-less growing mix. Water the pots well, and expect germination in about 2 weeks. When the young plants have true leaves, thin them to one plant per pot by snipping off the weaker ones at soil level. Feed them a balanced soluble fertilizer solution, and transplant them when you see roots on the outside of the pots. Plants whose roots are disturbed might be set back, or might die, so be careful.

HARVESTING, STORING, AND PRESERVING

Wait until frost kills the vines to harvest the pumpkins. Cut each gourd off the stem with a small portion of stem attached. Wipe clean using a dry cloth, and place the pumpkins in a warm, dry location where they will keep for 6 months or more.

Pumpkin dries well. Slice off the top and remove the seeds. Slice the fruit into rings and hang them in a dry, airy place, or use a food dehydrator if you live in a humid region. To use, rehydrate the pumpkin and remove and discard the skin.

You can can or freeze cooked pumpkin or pumpkin pie filling, although the raw fruits keep so well, few bother to do this.

SPECIAL TIPS

Install a sturdy trellis the vines can grab with their tendrils and climb. Sisal twine strung vertically every 6 inches (15.25cm) along a horizontal support works well. Make the trellis about 6 feet (1.75m) tall if you're growing pie pumpkins. It must have sturdy supports because it will be subject to a lot of wind pressure when the fruits have matured.

Individual pumpkins need support, too. Craft small hammocks from cloth and tie these separately to the trellis to support the developing fruit, or you risk them dropping prematurely.



Scallion



Scallions, also known as “green onions” or “spring onions,” are the backyard gardener’s best friend among flavorings because they grow at all seasons and under varied circumstances.

Scallions are an excellent choice to tuck in among other plants in the corners or ends of your straw bale garden. You can also devote a whole bale to them, planting in spring and harvesting as needed throughout the season.

WHEN TO PLANT

Start scallions from seeds in early spring, either indoors or out. Sow them directly on prepared straw bales, using the soil-less growing mix method.

Scallion plants are seldom offered commercially, but you can start your own plants if you prefer (more on this later).

HOW MUCH TO GROW

Scallions have many uses in the kitchen. An entire bale should keep you in scallions throughout the growing season. If you put clumps of scallions here and there in the bales, always replace a removed clump with a new one to keep them growing all season.

PESTS AND DISEASES

Scallions are generally free of pests and diseases. You’re unlikely to have any trouble from them, and scallions’ presence in the garden might help repel some pests from other plants. Growing scallions with lettuce, for example, helps deter aphids.

STARTING YOUR OWN SEEDS

You can start scallions from seed easily, indoors or out, depending on the weather. Because they tolerate some shade, they're a great choice for starting indoors where the available light is less than ideal for other vegetables.

Fill a 24- to 36-cell nursery flat with soil-less growing mix, and water well. Sprinkle a few scallion seeds into each cell, and cover them with a thin layer of vermiculite or growing mix. Water again and place in a sunny window or under artificial light. The seedlings should emerge in about a week. Feed them at this point with a balanced, soluble fertilizer and keep them watered until they're at least 3 inches (7.5cm) tall before transplanting. Carefully remove the entire clump from the cell, and place it in the bale.

HARVESTING, STORING, AND PRESERVING

Pull scallions as you need them for the kitchen. They're best used immediately, or you can wash and trim them and keep them for a few days in a plastic container in the refrigerator. If you want them to remain straight during storage, tie the ends together with kitchen string so they don't curve and twist as they continue trying to grow.

Although long-term storage of scallions isn't common, you can preserve them for later use. Snip fresh scallions into pieces suitable for cooking, add a small amount into each section of an ice cube tray, cover with water, and freeze overnight. Tip out the cubes, place in a freezer container, and return to the freezer for later use. Or use the scallions in compound butter. Combine snipped scallions with softened butter until you have a mixture that looks appetizing—about 2 tablespoons fresh scallions for every 1 (8-tablespoons) stick butter. Shape the mixture into a log or divide into convenient quantities, wrap well with aluminum foil, and freeze.

SPECIAL TIPS

Scallions can be both annual and perennial. Perennial varieties are typically identified as “bunching onions” or “evergreen bunching onions.” These are most likely to remain usable all season long when grown in most of the temperate zone. Annual scallions die out during cold winter weather but are a great choice for growing in bales in cool summer areas.

You can find select varieties of scallions in seed catalogs and online, including some that produce red root tips.



Scallion

Shallot



Shallots are a species of bulb-forming onion that produce new bulbs each season as offsets from last season's bulbs. Much like garlic, shallots have been cultivated for centuries, resulting in a variety that is more or less well adapted to cultivation at any given latitude. Check online or seek out local advice about what particular variety of shallot does best in your climate.

WHEN TO PLANT

Shallots require a long growing season. In some areas, they're planted in fall and allowed to grow through the winter to be harvested around the summer solstice. Throughout much of the temperate zone, however, they can be planted in spring, along with storage onions, and harvested the subsequent fall.

Plant shallots as soon as the gardening season begins, up to a month before the last spring frost in your area. Shallot foliage may be killed by a late freeze, but the bulbs will resprout and continue growing when the weather warms again.

To plant, simply stick bulbs into a conditioned straw bale wherever you have a bit of room. Shallots are a good choice for the ends of the bales. Expect them to sit there a while as roots form, but eventually they'll produce green sprouts.

HOW MUCH TO GROW

Each bulb you plant will produce three to five usable offspring. Consider your need for shallots in the kitchen when determining how many to plant in your bales. If you really love shallots, you might want to plant an entire bale of them.

PESTS AND DISEASES

Like the other members of the onion family, shallots seldom have problems when grown in straw bales because viruses and fungi are mostly transmitted via soil. Growing shallots with other vegetables might help deter some pests.

STARTING YOUR OWN SEEDS

Shallots are seldom, if ever, started from seed. Purchase stock from commercial breeders, and be sure you opt for a named variety suited to your latitude.

HARVESTING, STORING, AND PRESERVING

Harvest shallots when the tops begin to turn yellow and fall over, typically in early fall, or about 120 to 150 days after the foliage emerged from the bulbs. Pull the entire plant; spread them on newspaper; and place in a warm, dry location until the tops are thoroughly dry—a week or two. Then cut off the tops and store the bulbs loosely packed in baskets. Keep them in a dry, dark place, along with other types of onions, where they will keep for months.

Shallots freeze easily. Prepare them for cooking and drop into boiling water for 1 minute, drain, plunge into cold water, and drain well again. Either place the blanched shallots in individual freezer containers or spread on a baking sheet and freeze overnight. If you use the baking sheet method, transfer the frozen shallots to a closeable container and return them to the freezer for later use.

SPECIAL TIPS

Do some research on the varieties of shallots that do well in your region. If you select a strain that isn't adapted to your climate, you're not likely to get any offset bulbs.

If your growing space is limited, you'll have better results with other types of storage onions than shallots.



Spinach, Malabar



Malabar spinach is not related to spinach, but because it loves heat and water, it makes a great substitute in areas of the world where summers are too warm for spinach to grow. As a bonus, Malabar spinach adds a decorative element to the straw bale garden.

WHEN TO PLANT

Plant Malabar spinach when the weather is warm and settled, about 1 month after the last spring frost in your area. You can gain some time on the season by starting seeds indoors if you have sufficiently bright lighting available.

If you're a beginning gardener, purchase started plants at a local garden center, if possible. They'll appear, along with eggplant and peppers, at the proper planting time in your area.

HOW MUCH TO GROW

Malabar spinach is a vigorous vine that needs strong support. One or two plants, which you can harvest repeatedly, provide greens for most of the summer season. It's a good plant to place in the space between two bales, too. Wherever you plant it, be sure to use a string or wire trellis to support it. The vines climb by twining, in the same manner as pole beans.

PESTS AND DISEASES

No significant disease problems occur with Malabar spinach. Insect pests are few and are limited only to nonspecific chewing pests. I've seen unaffected Malabar spinach plants growing alongside eggplants that were covered with flea beetles.

STARTING YOUR OWN SEEDS

Malabar spinach is easy to start from seed and can be seeded directly into straw bales, using the soil-less growing mix method. To get a jump on the season, you can start seeds in small pots indoors and transplant them to the garden after a month or so of growth.

Fill small pots with soil-less growing mix, and place two or three seeds in each pot. Press the seeds into the soil with a pencil eraser or your fingertip, burying them about ½ inch (1.25cm) deep. Soak the seeds in water overnight before planting to loosen the seed coat and hasten germination. Without soaking, it could take a month for seedlings to appear. The plants grow very slowly when they're young and shouldn't be transferred to the garden until they show signs of wanting to climb, with the stems twisting and turning in search of support.

HARVESTING, STORING, AND PRESERVING

Malabar spinach is best eaten as a salad green. When cooked, its texture becomes unappetizing to some people. The flavor strongly resembles that of spinach, whether raw or cooked. Harvest individual leaves as you need them. If you want to store them, wash the leaves; dry them in a salad spinner; and store in a plastic bag in the refrigerator, adding a paper towel to absorb excess moisture. Long-term storage, freezing, and canning is not recommended.

Malabar spinach stems are sometimes cut into bite-size pieces and included in stir-fry dishes. They have a flavor reminiscent of beets.

SPECIAL TIPS

It's difficult to overwater a straw bale garden, and this is definitely to your advantage when growing Malabar spinach. The plant loves water, and keeping it on the moist side discourages blooming. When the plants bloom, the kitchen quality suffers, and you also have the possibility of seed production. In some regions with mild winters, self-sown Malabar spinach seedlings can become a weed. The daily watering recommended for straw bale gardens virtually eliminates this possibility.

In all events, if blooms do appear, increase watering and remove the stems with flowers. This should stimulate tender new growth that will have a better taste.



Spinach, New Zealand



New Zealand spinach isn't actually related to spinach, but the leaves are very similar in shape. This easy-to-grow plant substitutes for spinach where summers are too hot for spinach to produce a satisfactory crop. New Zealand spinach needs to be cooked to render it palatable, due to its high content of oxalic acid; don't try to eat it raw.

WHEN TO PLANT

Plant New Zealand spinach in the bales after the weather is warm and settled—a couple of weeks to a month after the last frost date in your area. The plant takes a while to get going; if you can find started plants from a greenhouse, so much the better, or you can start your own plants indoors.

Direct seeding New Zealand spinach into bales is not recommended unless you live in a warmer region. The seeds take a long time to germinate, and plants grow very slowly when they're small. Much of the growing season, therefore, is taken up with the plant's early development.

HOW MUCH TO GROW

New Zealand spinach is a short, trailing vine that meanders among other plants rather than climbs, making it an excellent choice for planting with taller plants such as tomatoes or peppers. It doesn't grow aggressively, and if combined with a more dominant plant like cucumbers, it's likely to be overwhelmed.

PESTS AND DISEASES

Pests and diseases are seldom a problem for this New Zealand native. Even Japanese beetles and garden slugs leave it alone.

STARTING YOUR OWN SEEDS

If you have a warm, well-lit spot indoors, you can start New Zealand spinach 2 weeks before your average last spring frost date and have plants ready for the garden about 6 weeks later.

Fill small pots with soil-less growing mix, and place a single soaked fruit in each pot. Use your finger or a pencil to press the fruit below the soil surface about ½ inch (1.25cm). Water the pot well, and have patience. It may take 3 weeks for the seedlings to appear, even if you softened the seed coat before planting. You'll get five or six seedlings from each fruit. Leave the entire clump to grow, as thinning might damage the delicate root system.

Feed the seedlings with a balanced, soluble fertilizer soon after they emerge, and repeat this feeding every 2 weeks until you transfer them to straw bales. Plant the entire clump. They'll sort themselves out as they creep among the other vegetables.

HARVESTING, STORING, AND PRESERVING

Harvest only the tips of the stems of New Zealand spinach (about 3 or 4 inches; 7.5 to 10cm), leaving the rest behind to resprout. Begin harvesting when the clump is about 1 foot (30.5cm) in diameter, and continue all season as the plants grow.

Use New Zealand spinach the day you harvest, or wash it well, dry in a salad spinner, and store in a plastic bag in the refrigerator for a few days at most.

To cook, drop the stems and leaves into boiling water, simmer for 1 minute, drain, and return to the pot with a small amount of fresh water. Steam the spinach for a few minutes until it's as tender as you like, and serve.

SPECIAL TIPS

When you purchase New Zealand spinach seeds, what you actually get is the unusual, tetragonal, horned fruit. The outer coat of the fruit is almost as hard as a hazelnut, enclosing half a dozen seeds. It's essential that you soak the fruit overnight or even for a couple days before planting to soften the seed coat.



Squash, Summer



Summer squash is ideal for growing in straw bales. Compact varieties, of which there are many, thrive when grown in a bale, yielding quite a harvest of delicious fruits.

WHEN TO PLANT

Summer squash matures rapidly, so don't be in a hurry to plant it. On the other hand, it's among the more cool-tolerant species of the squash family, and planting it mid-spring yields a crop by June. You can move squash plants into bales as soon as the spring frost date has passed. Succession plantings keep the harvest booming into fall; plant every 3 weeks until mid-August or so. Most varieties mature in 60 to 70 days.

HOW MUCH TO GROW

Summer squash can be extremely productive. Each plant is likely to yield two or three fruits per week. Choose different cultivars to have a variety of shapes and colors of fruit.

PESTS AND DISEASES

Where they occur, squash vine borers are the most significant pest. The borer is the larva of a moth native to the Americas and is difficult to control with pesticides because it's protected within the stem of the plant. About the only 100 percent effective ploy to thwart them is to cover the plants with a light fabric until the first blooms appear. By then, the stems will have toughened and are unlikely to appeal to borers.

The squash bug might also be a problem. It pierces fruits with its sucking mouthparts, creating a spot for rot to begin and transmitting disease among plants. Crushing the eggs and picking off the adults by hand offers the most sensible method of control where only a few plants are involved. Neem oil spray also repels the bugs.

Summer squash leaves are especially susceptible to powdery mildew, which is likely to appear after cool, damp weather. Neem oil spray is an effective control.

STARTING YOUR OWN SEEDS

You can sow the large summer squash seeds directly in the bales using the soil-less growing mix method. They're also easy to start in biodegradable pots.

Fill pots with soil-less growing mix, place three seeds in each, and water well. Germination should occur in 1 week to 10 days. When true leaves begin to form, using scissors, clip off all but the strongest plant in each pot at the soil line. Feed the plants with a balanced soluble fertilizer, and transplant them to bales as soon as a root or two appears on the outside of the pot. Don't allow them to become potbound, and don't damage the roots when transplanting.

HARVESTING, STORING, AND PRESERVING

Harvest summer squash as soon as the fruits have colored and are the size you prefer. As a rule, err on the side of early harvest. Younger fruits are sweeter and tenderer than older ones. Fully mature fruits are enormous and should only be left on the plants if you intend to save seeds.

Freshly picked, undamaged squash keeps for several days at room temperature and for a week or more in the refrigerator. However, its sweetness fades soon after harvest, so you get the best flavor when you use the squash the same day you pick it.

For longer-term preservation, you can freeze squash. Prepare for cooking and drop into boiling water for 1 minute. Drain, plunge into cold water, and drain well again. Place the blanched squash in a freezer container and freeze. Or dry squash in a food dehydrator. Making squash pickles or relish is another option to preserve the bounty. Baked goods containing squash can also be frozen for out-of-season use.

SPECIAL TIPS

Zucchini, the long, usually dark green variety of summer squash, also comes in bright yellow, pale green, striped, and even two-toned forms. Yellow squashes come in both "straight neck" and "crook neck" versions, each with a bulbous end containing the seeds. "Pattypan" squash, which form flattened, disclike fruits with scalloped edges, can be white, yellow, green, or two-toned. All these types are grown exactly the same way.



Squash, Winter



The squash family contains between 15 and 35 natural species, divided into “summer” and “winter” categories. These can sometimes be different forms of the same botanical species that simply have differing fruit characteristics.

As a rule, winter squash are eaten in the mature stage, when the skin is tough and the flesh has become a repository for sugar and vitamins. Winter squash store well without special preparation. Summer squash have soft skin, are typically eaten long before they mature, and don’t keep unless prepared by freezing or drying. Summer squash is harvested throughout the season; winter squash is left to mature until the vines are killed by autumn’s first frost.

WHEN TO PLANT

Winter squash need about 120 days from germination to produce mature fruit. You’ll generally make a single planting after the weather warms up in spring and leave plants to grow until fruits mature. A good target date for planting is 1 month after last spring frost date.

HOW MUCH TO GROW

Winter squash aren’t as productive per plant as summer squash, but they can be impressive. Even compact varieties produce 6 or more fruits per plant, and each generally provides four or more servings when cooked. A single bale with two plants should meet the needs of the average household.

PESTS AND DISEASES

Winter squash have the same issues summer squash have, with one exception. One of the most desirable winter squashes, the “butternut” squash, is immune to the vine borer.

With the good growing conditions afforded by the straw bale method, most of the problems squash develop can be dealt with by spraying with neem oil or by picking off pests by hand.

STARTING YOUR OWN SEEDS

You can start winter squash in biodegradable pots about 6 weeks before you intend to transplant them to the garden. Fill the pots with soil-less growing mix and place two or three seeds in each. Water the pots, and place them in a warm, sunny location. Germination will require 1 week to 14 days.

When the plants develop true leaves, thin to one per pot. Fertilize them with the standard soluble, balanced fertilizer solution. Feed again in 2 weeks if you haven’t moved them to the bales.

Grow two or three plants per bale if using a trellis or one plant per bale if you use the four-bale patch arrangement.

HARVESTING, STORING, AND PRESERVING

Winter squash are ready to harvest when the skin is the proper color for the variety and you can’t easily pierce it with your thumbnail. Many gardeners leave fruits on the plant until frost kills the vines to ensure maximum development of the fruit. To harvest, cut the fruit from the vine, leaving 1 inch (2.5cm) or so of stem still attached. Wipe any debris from the squash using a dry cloth, and store them in a warm, dry location away from light, for up to 6 months.

Squash can also be peeled, cut into chunks, and canned or frozen. (Consult books on food preservation for precise methods.) Winter squash also dries well.

You can wash, dry, and roast the seeds of most winter squashes. They make a delicious snack or garnish for salads or other dishes.

SPECIAL TIPS

Winter squash produce vigorous vines that require a sturdy trellis. The vines climb by tendrils, like other members of the family. In addition, the fruits need to be supported with hammocks.

Compact varieties of some winter squash are available. These are ideal choices for growing in a four-bale “patch.” Grow these varieties when you don’t want to build a trellis. They are slightly less productive than larger types, but the fruit quality is similar.



Tomatillo



Like the tomato, the tomatillo is native to the New World. For some reason, however, the indigenous name for the fruit, *tomate*, became associated with the tomato, not the plant we know today as the tomatillo. Whatever it's called, for a good combination of compact growth habit and heavy yields of fruit, the tomatillo is an ideal addition to your straw bale garden.

WHEN TO PLANT

You can plant tomatillos along with other members of the tomato family, such as peppers. Tomatillos love warmth, so wait to plant until the weather is settled, 2 weeks to 1 month after your last spring frost date. Buy plants from a garden center to give them the longest possible growing season. Because tomatillos bear continuously once they mature, you can harvest until frost.

HOW MUCH TO GROW

A single plant provides an abundance of fruits, much like a cherry tomato. Unless you need many fruits for canning, one or two plants should be plenty. The most commonly available cultivars reach about 2 feet (.5m) tall. You can plant one in a bale that also holds cucumbers or squash, and they'll coexist happily.

PESTS AND DISEASES

Although the tomato hornworm, where it occurs, may also attack tomatillos, few other insect pests bother them. This might have something to do with the nonfruit parts of the plant being poisonous, a condition found also in tomatoes and potatoes.

The tomatillo seems to have escaped many of the fungal and viral diseases that affect other plants.

STARTING YOUR OWN SEEDS

Tomatillos are easy to start from seed. If you have a warm, sunny space to hold them, you can start seeds indoors or out as early as April. If you use an outdoor growing space, be prepared to bring the seedlings in each night to protect them from cool temperatures.

Fill small pots with a soil-less growing mix and sow two or three seeds per pot, barely covering them with growing mix or vermiculite. Water the pots, and keep them at 70°F (21°C). Germination should occur within 2 weeks. When true leaves appear, snip off the two weakest plants in each pot, and feed with a balanced soluble fertilizer. The plants can go into bales when they have at least two pairs of true leaves. If you need to keep them indoors longer than anticipated, transfer them to larger pots and continue caring for them until the weather settles.

Root suckers sometimes grow at the base of a tomatillo plant. You can remove the sucker and root it in a glass of water to use for a late planting. (This only works if you have a sufficiently long growing season.)

HARVESTING, STORING, AND PRESERVING

Some tomatillos don't ripen until they're removed from the plant, while others drop their fruit when it's time to harvest. Read the description of the plants you purchase to determine what to expect from that specific variety.

If in doubt, harvest green tomatillos when they're about the size of an egg and leave them in a basket at room temperature. They'll ripen to a golden yellow color, and the enclosing husk will split and begin to peel back. The fruits will keep a long time at room temperature and should not be refrigerated.

The classic way to preserve tomatillos is to can them in water. The fruits are husked, washed, and packed whole into jars. They're then covered with salted water and processed like tomatoes. Unlike tomatoes, however, tomatillos retain a slightly crisp texture when canned.

SPECIAL TIPS

Some tomatillo varieties get huge and bear heavily, but they're less well suited to the straw bale garden than the more compact forms. If you do decide to grow one of the big ones, be sure you provide sturdy support. The plants can get so heavy with fruit they can uproot themselves from the bale and tip over in high winds.



Tomato, Cherry



If your straw bale garden is going to have only one tomato plant, make it a cherry. Although the vines can get rather large, cherry tomatoes offer more fruit in less growing space than almost any other summer crop. They can be eaten straight from the vine, added whole or sliced to salads, or used in place of larger tomatoes in any dish.

Recent interest in heirloom vegetables has brought new shapes, sizes, and colors of cherry tomatoes to garden centers. They all grow the same way, and they thrive in straw bale gardens.

WHEN TO PLANT

Wait until after the last spring frost in your area to plant. The heat of a straw bale and the ease with which you can cover a wire support trellis against late cold snaps enable you to yield the earliest crop of tomatoes in your area. Nevertheless, most cherry tomatoes require more than 2 months to mature a crop and continue to bear fruit until autumn.

HOW MUCH TO GROW

Most cherry tomatoes are “indeterminate” growers—the plant’s main stem continues to lengthen and bloom indefinitely. Therefore, they require a sturdy support to keep them in bounds. I recommend a T-post and wire trellis in which you tie the tomato vine to the horizontal wire, using a soft twine or strips of cloth, and train it along the length of the garden. Fruits are borne in clusters along the main stem.

Side shoots, or “suckers,” arise periodically along the stem at the point where a leaf attaches. You can train these as secondary bearing stems, clip and root them for a later crop, or simply remove them.

PESTS AND DISEASES

Planting in straw bales eliminates all sorts of fungal diseases common to tomatoes. Perhaps no other benefit is greater, in areas where these fungi are problematic.

Alas, the same cannot be said for insect pests. Early plantings may be attacked by flea beetles, and in hot weather, the tomato hornworm can devour all the foliage on a plant in a matter of days. These pests are not universal, and in areas where summers are relatively cool, tomatoes might have no pests at all.

If flea beetles are a problem in your area, cover the plants with a light row cover to deny the beetles access. Remove tomato hornworms by hand as soon as you see them, and destroy them so they can't return.

STARTING YOUR OWN SEEDS

If you have a suitable indoor space with bright light, you can start your own early tomato plants. Where the growing season is long, you can start cherry tomatoes outdoors in late spring for a late summer and fall harvest.

Sow three seeds in each of several small containers filled with a soil-less growing mix, barely cover the seeds with growing mix or vermiculite, and water well. Expect germination in about 2 weeks.

When true leaves appear, use scissors to snip off the two weaker seedlings at the soil line. At this time, feed the plants with a balanced soluble fertilizer. When they have at least two pairs of true leaves, transfer them to a bale.

HARVESTING, STORING, AND PRESERVING

Harvest tomatoes as they ripen. You should use ripe cherry tomatoes the day they're harvested, but they will keep in a bowl on the kitchen counter for a few days.

Never store tomatoes in the refrigerator. Doing so destroys their homegrown flavor. If you have an abundance, turn them into pickles, juice, salsa, or your favorite tomato-based food.

You can freeze tomatoes for later use. Simply freeze whole, unpeeled cherry tomatoes in freezer containers. After they thaw, you can slip off the skins easily and use the fruit in any recipe calling for canned tomatoes.

At the end of the season, pick the remaining green cherry tomatoes and pickle them for use later on your holiday party trays.

SPECIAL TIPS

Plant two varieties of cherry tomatoes per bale, and train the vines to intertwine for a decorative effect when fruits begin to ripen. You can find red, yellow, purple, green, pink, and two-tone tomato seeds in catalogs or online.



Tomato, Determinate



Among the many great innovations plant breeders have created to benefit the backyard grower, perhaps none compares with the determinate tomato. In nature, tomatoes are sprawling perennials that can cover large areas with their coarse, ropelike vines that root wherever they touch moist soil. Centuries of selection, coupled with modern plant breeding, has transformed the ungainly plant into a compact, retrained bush ideal for straw bale gardens.

WHEN TO PLANT

Maturity times vary, but most determinate tomatoes are ready to pick in about 70 days from planting. Straw bale gardens can be planted early, around the last frost date for your area, but be prepared to protect early tomato plants if late cold snaps are a possibility. One month following the frost date is a conservative planting date. If planted too early, tomatoes usually survive, provided you protect them from frost. At worst, they just sit there until the weather is warm enough for growth to commence.

If you have room, you can plant tomatoes in succession up until the time the maturity date coincides with your area's likely first fall frost date.

HOW MUCH TO GROW

Determinate tomatoes typically bear a few early fruits, then an abundant main crop, and then a few later fruits before they begin to look tired. They're ideal if you want to can a few jars because the main crop will be heavy.

PESTS AND DISEASES

Because they're largely modern breeds, determinate tomatoes often have genetic resistance to the most

common tomato diseases, verticillium wilt and fusarium blight. And these are seldom an issue in straw bale gardens, so your tomatoes are likely to be disease free.

Various pests such as tomato hornworms, flea beetles, and squash bugs might attack determinate tomatoes. But because they have a compact growth form, determinate tomatoes are easy to protect with lightweight fabric covers—a more effective method of pest control than sprays.

STARTING YOUR OWN SEEDS

You can start determinate tomatoes from seed about 6 weeks before you want to plant them in your garden. Sow seeds in small containers of soil-less potting mix, covered thinly. They should germinate in about 2 weeks. When true leaves appear, use scissors to snip off the two weaker seedlings at the soil line. Feed the plants with a balanced soluble fertilizer. When they have at least two pairs of true leaves, transfer them to a bale.

Because determinate tomatoes grow, mature, and die in a relatively short time, they're a good choice for succession planting. You can start seeds for later crops outdoors, as long as you protect them from cold nighttime temperatures.

HARVESTING, STORING, AND PRESERVING

Determinate tomatoes have been bred to bear heavily for your convenience. Harvest all the ripe fruit at once, and process within 2 or 3 days. Do not refrigerate tomatoes. Instead, keep them at room temperature and out of the sun.

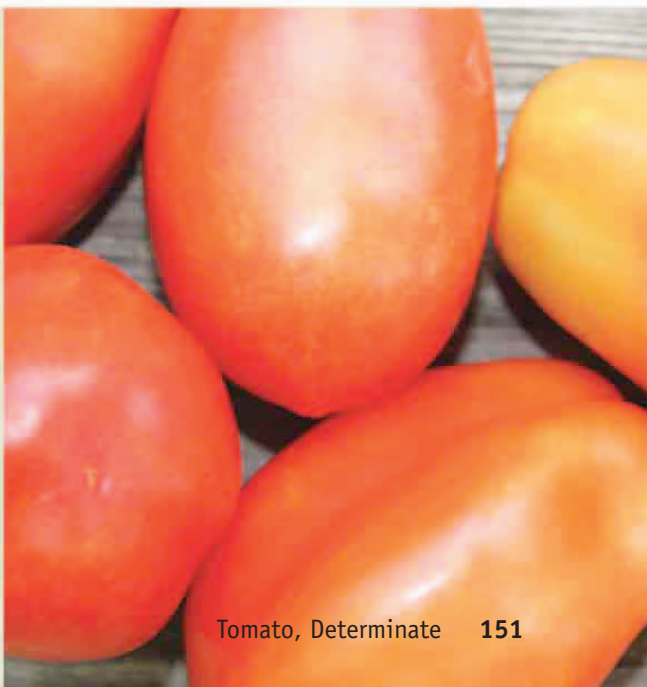
Use freshly picked determinate tomatoes just like any other tomato. If you're growing them to can, pay attention to all recommendations in your preferred recipe as to processing times.

Freeze ripe tomatoes, either whole or in halves, in freezer containers. When thawed, the skins will slip off easily. Frozen tomatoes are excellent for salsa, pasta sauces, or soups.

SPECIAL TIPS

Support determinate tomatoes with a wire cage at least 5 feet (1.5m) tall. Stabilize the cage with a long stake driven into the ground at the side of the bale and attached to the cage with short lengths of galvanized wire. When heavy with fruits, the entire bale can tip over from the weight of the tomatoes if you don't take this precaution.

You also can tie determinate plants to a T-post and wire trellis, using strips of cloth or soft twine to secure the main stem and side branches. This method is better if you plan to grow several kinds of tomatoes near each other in a series of bales.



Tomato, Heirloom



Vegetable varieties 50 years old and older are often called “heirlooms.” A few heirloom tomatoes are the product of scientific breeding efforts, but most have been saved by gardeners and passed down through generations. Often, heirlooms are associated with a particular region. For example, the Cherokee Purple tomato is said to have originated with the Cherokees of the southern Appalachians and migrated to the gardens of the early European settlers. Besides having fantastic flavor, Cherokee Purple is well adapted to the climate of its “home” region.

WHEN TO PLANT

Maturity dates for heirloom tomatoes vary, but some can take a long time to start bearing fruits. The time to maturity is counted from the date you place the plant in your straw bale. Plant early enough to ensure the tomato has time to mature before cold weather returns, but not so early that the young plants chill in the late spring cold. Wait until 1 month after your last frost before planting.

When planted in straw bales, tomatoes face less chance of damage, as the roots are warmed by the bale’s internal heat. Be prepared, however, to protect the foliage from a late frost. Damaged leaves set the plant back and delay fruit production.

HOW MUCH TO GROW

Grown primarily for their fine flavors and unique shapes and colors, heirloom tomatoes may not be as productive as some modern types. If you want enough tomatoes to eat fresh, you can plant one of each type you select. If you want a lot more, you’ll need more than one plant.

Heirlooms vary widely in their adaptability. It's wise to grow a new variety on an experimental basis the first year. Even with the advantages of the straw bale method, a randomly selected heirloom better suited to a location far from yours could fail.

PESTS AND DISEASES

Many heirlooms have natural immunity to the pests and diseases that occur in the region where the heirloom was developed. However, as a group, heirlooms lack resistance to the most common diseases, especially when grown outside their historical range. Fortunately, disease is less of a problem for tomatoes grown in straw bales.

Insect pests are best thwarted by covering plants with lightweight fabric cover. Spraying is more costly and likely to be less effective against nonspecific chewing insects that attack tomatoes. Squash bugs, in particular, can damage the crop by creating blemishes on the fruits with their sucking mouthparts.

STARTING YOUR OWN SEEDS

One of the best ways to obtain local heirloom varieties is to attend a seed swap, often sponsored by garden clubs or other groups to raise funds or provide community education opportunities. For heirloom vegetables of all types, gardeners collect and save seeds, because heirlooms are “open pollinated.” This means seed from this year's crop will produce a similar crop next season. Given the longevity of tomato seeds—about 7 years under good conditions—it's possible to gradually build a collection of varieties that do well in your garden.

Start seeds in small pots of soil-less growing mix and cover lightly. Germination may be spotty, so wait a full 2 weeks before deciding a plant isn't going to come up. When you have seedlings, thin them to one per pot, and feed them with soluble, balanced fertilizer every 2 weeks until transplanting.

HARVESTING, STORING, AND PRESERVING

You can freeze or can heirloom tomatoes like any other type, but their complex flavors are best when they're fresh and raw. They're great on sandwiches, salads, and salsa cruda. If you have more than one variety, combine slices of each on a plate with olive oil, salt, pepper, and a few torn leaves of fresh basil. Summer on a plate!

SPECIAL TIPS

The world of heirloom tomatoes can be wondrous, especially to the beginning gardener. Resist the temptation to grow just several varieties of heirlooms until you've had success with other types. When you feel comfortable with tomatoes in general, you can experiment with some of the heirlooms.



Tomato, Hybrid



Hybrid tomatoes are the product of hand-crossing parental stocks to produce an ideal tomato. Hybrids offer enhanced disease resistance along with the effects of “hybrid vigor.” Hybrid plants are often larger and more productive than either parent, and the fruit might be larger, too. Hybrids bred for large fruit can produce tomatoes weighing more than 2 pounds (1kg)! For straw bale gardeners, the disease resistance of hybrids is less important than their fruiting characteristics. Both determinate and indeterminate growth forms are available as hybrids.

WHEN TO PLANT

Among the characteristics tomato breeders seek when attempting to improve a strain may be the ability to produce a crop in fewer days than is typical for the species. Early tomatoes are beneficial for gardeners who live where the growing season is short, or those in milder areas who simply want tomatoes as soon as possible after planting. When growing in straw bales, you can plant tomatoes about 2 weeks to 1 month after the last spring frost in your area. If late cold snaps are likely, be prepared to protect the plants against frost.

HOW MUCH TO GROW

Hybrid tomatoes, as mentioned, can be either determinate or indeterminate in growth form. (Determinate tomatoes remain compact in size and produce their crop nearly all at once. Indeterminate tomatoes produce a crop over a long season, but the

main stem continues to elongate, producing potentially enormous plants.) Indeterminate tomatoes come in a wider range of colors, sizes, and flavors than determinates—all thanks to plant breeding efforts. If you want to preserve some of your harvest, choose determinate tomatoes; if you're primarily interested in fresh eating, choose indeterminate ones. One bale can accommodate two indeterminate plants and three determinate ones.

PESTS AND DISEASES

Hybrid tomatoes often have multiple disease resistance and demonstrate this characteristic especially well when they're grown in straw. Few plants seem as well adapted to straw bale gardening as tomatoes.

Pests attack hybrids just as they do other types of tomatoes. Unfortunately, no one has yet produced a hybrid that repels squash bugs, for example. To protect against pests, cover your hybrid tomatoes with a lightweight fabric or use neem oil spray.

STARTING YOUR OWN SEEDS

Hybrid tomatoes are just as easy to start from seed as any other type. Decide when you want to have plants ready for transplanting, based on the maturity date, and sow your seeds about 6 weeks prior to your transplant date.

Sow three seeds in each small pot of soil-less mix. Keep them watered but not soggy, and expect germination within 14 days. As soon as true leaves have formed, snip off the weaker two plants in each pot. Feed with balanced, soluble fertilizer at this point and again every 2 weeks. Transplant young plants to bales when at least two pairs of true leaves have formed. If you can't get them into bales on schedule, transplant them to larger pots.

HARVESTING, STORING, AND PRESERVING

Harvest hybrid tomatoes as they ripen. Ripe tomatoes have a uniform color and remain firm under gentle hand pressure. Soft tomatoes may be watery and unappetizing.

Store all tomatoes at room temperature. Refrigeration adversely affects both the flavor and texture and is the cause of poor-quality tomatoes often seen in grocery stores. Tomatoes keep 3 or 4 days at room temperature.

Canning and freezing are ideal preservation methods for all types of tomatoes, including hybrids. The uniform fruit size of many hybrids makes them especially easy to can whole.

SPECIAL TIPS

If you're growing hybrid tomatoes for size, it's best to support them with a T-post and wire trellis. Cradle the gigantic fruits produced by some supersize hybrids in a hammock made of cloth attached to the trellis. Otherwise, they could split their branch before they ripen.





SECTION 4

Cool Season Crops

From delicious greens to nutritious broccoli, the “cool season” crops bring new flavors to the table and new inspiration for the gardener as the seasons change. In mild summer regions, the cool season crops grow year round, often alongside some of the warm season varieties. In warmer climates, they make an appearance both early and late in the gardening year. In the following pages, I offer advice on starting your own cool season plants from seed, proper methods of harvest and storage, and more.



Arugula



Arugula is a great crop for impatient gardeners because the tasty leaves are ready to pick about 1 month after the seeds germinate. Although the plant becomes harsh and unpleasant when the weather warms up, arugula has a pleasant flavor reminiscent of peanuts when grown during the mild season.

WHEN TO PLANT

You can plant arugula in early spring and again in fall in some areas. It's cold tolerant, and some varieties even can remain unaffected in subfreezing temperatures. Because it matures a crop rapidly, arugula is a good candidate for succession planting. It can also be grown as a "cut and come again" crop, where individual leaves are harvested successively over a longer season.

You can plant arugula at any time you expect 40 days or so of mild weather. It's particularly good for interplanting with a longer-maturing crop, such as cabbage.

HOW MUCH TO GROW

Unless you really love arugula, you're unlikely to use more than a bale's worth of plants. Indeed, for the longest harvest, you should only sow about a third to a fourth of the bale at once and then wait a week or 10 days to sow more. This gives you a reasonable harvest over a long season. Arugula is generally mixed with other greens or herbs in a salad or used on sandwiches instead of lettuce, so you don't really need a huge amount all at once.

PESTS AND DISEASES

Arugula is largely free from pests and disease, although mature plants or those that are stressed from heat may attract aphids and munchers such as flea beetles. Should either of these problems befall your crop, it's better to remove the short-lived plants and use the space for something else.

STARTING YOUR OWN SEEDS

Arugula is almost always started by sowing seeds directly where they are to grow. However, if you're inclined to experimentation, the crop does transplant easily. This works best if you pick and discard the first batch of large leaves and then harvest the ones that resprout from the transplanted plants.

Use the soil-less growing mix method to ensure the tiny seeds don't sink too deeply into the straw. Once you have the growing mix in place, simply scatter the seeds thinly on the surface and press them into the mix with your palm. Water well, and expect germination within a week. They'll grow like gangbusters thereafter.

HARVESTING, STORING, AND PRESERVING

Pick individual leaves of arugula when they're 4 to 6 inches (10 to 15.25cm) in length. As the leaves grow, they become tougher and more strongly flavored. With a few tests, you can determine the stage when you prefer to harvest them. Snip off individual leaves near the base of the plants, and leave them to grow another crop. You can usually repeat this twice during the growing season. Blooms indicate the plants are done.

Rinse freshly picked arugula, dry in a salad spinner, and store it in a loosely covered container in the refrigerator for up to 3 days to a week.

Arugula isn't often preserved for later use, but it does lend itself to making pesto. Use any recipe you like for pesto sauce, and substitute arugula for some of the herbs called for in the recipe. You can freeze some of the finished sauce in small batches for later use.

SPECIAL TIPS

If allowed to flower, arugula produces seed you can save for another sowing later. The flowers themselves have a spiced nut flavor and can be used to garnish salads or soups. For a gourmet treat, look for "wild" arugula seeds, which produce smaller plants with deeply indented, fine-flavored leaves.



Beet



Straw bale gardeners can produce sweet, nutritious beets throughout the growing season in most of the temperate zone. Beets do their best when they can mature during cool weather; the roots are larger, tenderer, and sweeter than roots that form when the weather is hot.

Besides common red beets, other varieties are available. Orange, or “golden,” beets have sweet flesh and don’t “bleed” red juice like other varieties. You might also find bicolor beets with red and white roots. They look like targets when sliced crosswise.

WHEN TO PLANT

Plant early beets 2 weeks before the last spring frost date, using the soil-less growing mix method. You can sow in furrows and thin later, use a seed tape, or drop individual seeds about 4 inches (10cm) apart each way. Beet seeds are actually tiny fruits, from which more than one seedling will likely sprout.

Germination usually requires about 2 weeks, and you can continue to plant in succession every 2 or 3 weeks throughout the growing season. Beets can endure a light frost and be harvested spring through fall.

HOW MUCH TO GROW

Beets don’t produce nice roots if they’re crowded, so allocate at least a bale to get a worthwhile crop. About 50 beets fit in a single bale.

Note that the diameter of mature roots will reach the size suggested by the seed catalog only when the plants

mature during cool weather. Hot weather beets are smaller than others. Keep this in mind if you're planning for a summer crop.

PESTS AND DISEASES

Beets are generally free of pests and diseases. Your beets likely will only be bothered by nonspecific chewing insects, if at all. Beet root development may be reduced if they don't get enough phosphorus. If this seems to be the case with your beets, add a small amount of bone meal or wood ashes to the soil-less growing mix. Use about 1 ounce (25g) fertilizer per bale.

STARTING YOUR OWN SEEDS

Beets are almost always sown directly in the garden, but you can start seeds in small pots and transplant them. Use a seed flat with an 18- or 24-cell nursery tray and fill the tray with soil-less growing mix. Drop a seed into each cell, push it below the surface with a pencil eraser, and water the flat to settle and cover the seeds. Beets often take 3 weeks to germinate, so have patience. The best temperature for growing them is about 65°F (18°C). When your plants have several true leaves, move them to their permanent position in your straw bales. Take care not to damage the plants near the crown, or the roots may become misshapen.

HARVESTING, STORING, AND PRESERVING

Harvest beets when they're the size you prefer. Small ones about the size of a golf ball are better than overgrown ones, so err on the side of young and tender. Older beets are likely to be woody, and no amount of cooking can overcome this flaw. Rinse the debris from the beets, dry them gently with a kitchen towel, and cut off all but 1 inch (2.5cm) of the tops. Store the prepared beets in a humid container in the refrigerator, where they'll keep for several months. Check frequently and remove any that develop mold or soft spots.

You also can preserve beets by canning. You need a pressure canner for plain beets, or can beet pickles using only a water bath canner.

SPECIAL TIPS

Beet greens are edible and especially tasty when the plants are young. You can harvest a leaf or two from each plant when they're 6 inches (15.25cm) tall. Add the leaves to a salad or cook them, either in soup or as a vegetable. Don't remove too many leaves, though, or your root harvest will be reduced. You also can use the larger leaves cut from the roots. Select the tenderest ones and use in any recipe that calls for Swiss chard.



Broccoli and Broccolini



Members of the cabbage family, variously known as “brassicas” or “cruciferous” vegetables, broccoli and broccolini—a form of broccoli that consists mostly of side shoots—are high in minerals, vitamins, and phytochemicals. They’re some of the healthiest and most rewarding crops to grow where conditions are best. Members of this family are not, however, adaptable plants, and beginners might have to try again next year after a less-than-successful first attempt.

WHEN TO PLANT

Time your broccoli planting to ensure the plants aren’t exposed to nighttime temperatures above 70°F (21°C). Because the plants require a long time to mature, you might need to use transplants to extend the season. It’s best to purchase commercially grown transplants as soon as they are available. The internally generated heat of a straw bale garden means you don’t have to worry about frost damage when you plant early. You can always cover the plants for additional protection if necessary.

HOW MUCH TO GROW

Crowded broccoli plants will produce smaller heads or none at all. Plant four plants per straw bale, spacing them to provide each with the maximum available root space. For the straw bale gardener, smaller cultivars are best. Some broccoli varieties are so vigorous only two can be accommodated in one straw bale.

Each broccoli plant produces one main head. When you harvest this one, the plant responds by producing side shoots, each much smaller than the main head. You can harvest the side shoots as long as a month after cutting the main head.

PESTS AND DISEASES

In certain areas, caterpillars are the chief impediment to broccoli production. In particular, the larva of the white cabbage butterfly, *Pieris rapae*, can ruin the crop. Dust or spray products made from the bacterium *Bacillus thuringiensis* (*Bt*) provide effective control for the cabbage worms and several other insect pests.

Diseases are seldom an issue in the straw bale garden.

STARTING YOUR OWN SEEDS

If you have a well-illuminated indoor space, you can start broccoli from seeds. Beginning 1 month to 6 weeks before your desired transplant date, fill an 18-cell nursery tray with sterile, soil-less growing mix. Sow the seeds, two or three per cell, and cover them with a thin layer of vermiculite or growing mix. Water well, and place where the temperature remains around 60°F (15.5°C). When the plants emerge in about 10 days, feed them with a balanced soluble fertilizer. When true leaves appear, use scissors to snip off the weaker plants at soil level, leaving one plant per cell. They're ready to transplant when they have three pairs of true leaves.

Take care to keep young plants growing rapidly, and don't allow them to wilt. Otherwise, they may not yield a harvest.

HARVESTING, STORING, AND PRESERVING

Cut the main broccoli heads when they're firm, before even the slightest hint of yellow coloration appears. Harvest the side shoots similarly, about 2 weeks thereafter. It's better to harvest them when too young than when overly mature.

Fresh broccoli keeps a week in the refrigerator if it's prevented from drying out.

Broccoli may be canned, but the texture is better and fewer nutrients are lost when it's frozen. Cut into bite-size pieces and drop into boiling water for 3 minutes. Drain, plunge into ice water to stop the cooking and set the color, drain again, place in appropriate containers, and freeze.

SPECIAL TIPS

Cut broccolini's side shoots when they're about 6 inches (15.25cm) long but before the flowers open. More tender and more distinctly flavored than regular broccoli, broccolini is a sensible choice where space is limited, as it can be grown much more closely planted than regular broccoli. Otherwise, care is the same.



Brussels Sprout

Brussels sprouts produce little cabbages in the leaf axils. Legendary for their cold tolerance, brussels sprouts are said to improve in flavor after a frost.



WHEN TO PLANT

It takes about 4 months for brussels sprouts to mature from transplanted seedlings, but the plant's cold tolerance means you can put them out very early in spring and again in late summer for a fall crop. Purchase started plants as soon as they appear in your local garden center, and get them into the bales promptly. Plan on having bales ready by about 1 month before your last spring frost.

In much of the temperate zone, brussels sprouts more reliably produce a crop from a late summer planting. Plant about 4 months before your average first frost date.

HOW MUCH TO GROW

Brussels sprouts are large and productive. One plant produces all the fresh sprouts two people would probably eat during the harvest season. To have enough to eat and freeze some for later, plant one bale with two plants. Be sure to supply a sturdy stake protruding at least 4 feet (1.25m) higher than the bale and sunk into the ground for stability. Brussels sprouts become top heavy when the crop matures, and the entire bale can tip over as a result.

PESTS AND DISEASES

Where it occurs, the cabbage butterfly, *Pieris rapae*, is perhaps the most serious pest to brussels sprouts. Control it with repeated applications of Bt.

STARTING YOUR OWN SEEDS

You can start brussels sprouts indoors from seed, provided you have access to bright artificial light. Seedlings that develop under insufficient light are weak, stemmy, and unlikely to produce a good crop.

Beginning 1 month to 6 weeks before your desired transplant date, fill an 18-cell nursery tray with sterile, soil-less growing mix. Sow two or three seeds per cell and cover with a thin layer of vermiculite or growing mix. Water well, and place in a cool, well-ventilated location. Maintain an average temperature of about 65°F (18°C), and keep them well watered. Feed with a balanced soluble fertilizer as the seedlings emerge, and feed again after you thin them. When the first set of true leaves appears, use scissors to snip off the weaker plants at ground level, leaving one plant per cell. Transplant to their permanent location when they're between 4 and 6 weeks old.

HARVESTING, STORING, AND PRESERVING

If you want a few sprouts for a fresh preparation, start by removing all the leaves from the bale up to the first sprout that forms. Then, as you pick sprouts, continue to remove the leaves up the stalk.

If you want a lot of sprouts at once, as sprouts begin to form, remove the top growth point, leaving all the larger leaves below it. This causes all the sprouts to pop up nearly simultaneously.

Freshly picked sprouts keep about a week in the refrigerator. Don't remove the outer leaves until you're ready to cook them. Freezing is the best method of preservation. Trim sprouts for cooking, and drop into boiling water for 3 to 5 minutes, depending on the diameter of the sprouts. Drain, and plunge into ice water. Place the sprouts in appropriate containers, and freeze.

SPECIAL TIPS

Not much plant breeding has taken place within the realm of brussels sprouts, and the selection of cultivars is limited. Go with the ones most widely available in your area.



Cabbage and Chinese Cabbage



These two cabbages are different plant species, but they serve the same basic purpose in the kitchen. Both are used as fresh and cooked greens and can be preserved in similar ways.

Cabbage—whether green, red, or savoy—is botanically the same plant as broccoli, cauliflower, and kale. Chinese cabbage is different in appearance and taste, and more closely related to mustards.

WHEN TO PLANT

Plant cabbage in spring or fall; different varieties have been bred to perform best in one season or the other. Members of the cabbage family are sensitive to length of day. Some “head up” best when days are lengthening, and others perform best as days are getting shorter. Be sure you select appropriately for the planting time you anticipate.

Chinese cabbage typically does best as a fall crop in most of the temperate zone. It's faster growing than cabbage and can be planted later in the season. Spring planting is not recommended.

HOW MUCH TO GROW

Of the varieties that fit well on a straw bale, each head weighs about 3 pounds (1.5kg). That's enough coleslaw for eight people. One bale grows four plants, at most.

Chinese cabbage heads are smaller, but grow more vertically and can be planted at eight to a bale. Because they mature rapidly, it's possible to grow a second planting to maturity before the season ends. Each plant yields two to four servings, depending on the specific cultivar. If you choose a dwarf variety, you'll have room for a dozen plants in one bale.

PESTS AND DISEASES

Cabbage butterflies, *Pieris rapae*, attack cabbage and Chinese cabbage with equal gusto. If you prefer to avoid using Bt to control them, use a row cover to exclude the butterfly altogether. With T-post and wire trellis supports, it's easy to drape the protective fabric over the bales.

Both cabbage and Chinese cabbage are easier to grow than broccoli, cauliflower, or brussels sprouts, especially in warmer climates.

STARTING YOUR OWN SEEDS

You can start cabbage and Chinese cabbage indoors under lights. Use an 18- or 24-cell tray in a standard nursery flat, and fill with soil-less growing mix. Place two or three seeds in each cell, water, and place under the lights, maintaining a temperature average of 65°F (18°C). Seeds typically germinate in 2 weeks' time. When true leaves appear, thin to one plant per cell, and feed with a soluble balanced fertilizer.

Chinese cabbage grows rapidly and can be transplanted to the garden after 2 or 3 weeks in the cell tray. Leave cabbage plants until they have at least two sets of true leaves, which will take about a week longer.

HARVESTING, STORING, AND PRESERVING

Harvest the entire head of either type of cabbage when it reaches the size you desire, or the mature size for the variety you're growing. Cabbage can vary from 1 pound (450g) to more than 5 pounds (2.5kg) per head.

Freshly harvested cabbage keeps under moist refrigeration for months, although it's always better when freshly harvested. Chinese cabbage also has a long storage life. Trim only the damaged outer leaves of either type of cabbage, and store the rest in a plastic bag in the refrigerator.

Long-term preservation of both cabbage and Chinese cabbage is best accomplished through fermentation. Making either sauerkraut or kimchee is a craft beyond the scope of this book, but the rewards of doing so are well worth the trouble.

SPECIAL TIPS

Look for dwarf cultivars of Chinese cabbage, which is also called "bok choy." The plants barely reach 8 inches (20.25cm) tall and can be grown in tight spacing.

Among cabbages, savoy types, with crinkled leaves, have the best cold tolerance and do well as a fall crop. "Early" varieties are better for spring planting, and mature a crop before the weather gets too warm.



Cauliflower



Cauliflower is not the easiest crop to grow, no matter what type of garden you grow it in. Where summers are hot and humid, and the cool season short, cauliflower needs plenty of care—and you need good luck—to produce a crop.

In cool summer regions, cauliflower fares much better, although it remains the most finicky of cabbage family crops.

WHEN TO PLANT

Cauliflower cultivars typically have day length requirements. Some are intended for spring sowing and bloom as the days are lengthening. Others are intended for a fall crop and must be sown to mature when the days are getting shorter. Some cultivars are intended for overwintering. Fall transplants gain some growth before the winter chill stops them. When warm temperatures return, the plants resume growing quickly and deliver an exceptionally early crop.

Be sure you know the requirements of the cauliflower variety you select. Overwintered types, for example, are less practical for a straw bale garden.

HOW MUCH TO GROW

Depending on both the nature of the cultivar and your skill in growing them, cauliflower heads can range from under 1 pound (450g) to about 3 pounds (1.5kg). You can fit two plants into one straw bale.

It's wise to transplant cauliflower on multiple occasions, separated by a few days, so you don't get the entire harvest at once. On the other hand, if you plan to freeze most of the crop, plant accordingly.

PESTS AND DISEASES

Like other members of the cabbage family, cauliflower is likely to be attacked by the cabbage butterfly, *Pieris rapae*, wherever this insect occurs. The bacterial product Bt is an effective control, or you can shield plants from insects with a lightweight “floating” row cover. One of the most convenient ways to use floating row cover is to drape it over a T-post and wire trellis support system.

STARTING YOUR OWN SEEDS

You can start cauliflower indoors under artificial lights. Pay special attention to the treatment of young seedlings, as setbacks early in life generally result in failure to produce a head later.

Sow seeds in 18- or 24-cell nursery trays filled with soil-less growing mix. Sow two or three seeds per cell, water, and thin to a single plant once they have true leaves. Feed after you thin, using a balanced soluble fertilizer, and transplant them when they have two or three pairs of true leaves. The temperature in the growing area should be about 65°F (18°C).

If you're a beginning gardener, I highly recommend you maximize your chances of success by purchasing commercially started plants for your first attempt at growing cauliflower.

HARVESTING, STORING, AND PRESERVING

Harvest the entire head while the curds are tight, pure white (if you're growing the white variety), and show no trace of yellowing. Cut the entire head, remove the green leaves, and store in a plastic container in the refrigerator. Use fresh cauliflower within a week. If the head begins to develop dark spots, use immediately.

The best method for preserving cauliflower is freezing. Cut the head into your preferred size of florets, drop in rapidly boiling water, and leave them for 3 minutes. Begin timing when the water returns to a boil. Drain florets, plunge into ice water to stop the cooking, and drain well again. Pack the cauliflower into freezer containers, and freeze.

Or spread the prepared florets on a baking sheet lined with waxed paper, and freeze overnight. The next day, transfer the frozen florets from the tray to a large resealable container, and return to the freezer.

SPECIAL TIPS

If you happen to live in a zone where cauliflower does not present a gardening challenge, you might want to consider some of the less common cultivars that produce heads in colors other than white. Both yellow and purple varieties are available from seed specialists. They're reportedly a little more difficult to grow than typical white cauliflower.



Celery and Celery Root



These two vegetables are actually different varieties of the same botanical species.

Your straw bale garden is an excellent environment for them because they require abundant water to produce a good-quality crop. Your choice will depend on how you plan to use the harvest.

WHEN TO PLANT

Celery and celery root both require cool, but not cold, weather. Plant early crops around the last spring frost date so they have 2 months or more to mature before the weather really heats up. Fall crops should go into the bales with sufficient time to grow to maturity before the frost date. The plants won't be killed by a light frost, but cold weather stops growth and a freeze causes the crowns to split.

HOW MUCH TO GROW

One straw bale holds six celery plants or six celery roots. Keep celery on 6-inch (15.25cm) centers, and space celery root a bit farther apart. Likely, one bale of either celery or celery root plants should be enough for a family of four.

PESTS AND DISEASES

The succulent stalks of celery attract munching pests, but this problem is less worrisome when the plants are grown in straw bales. Celery root is seldom subject to pests. If nonspecific chewing pests should appear, deter them with neem oil mixed with insecticidal soap before they do too much damage.

STARTING YOUR OWN SEEDS

Celery and celery root are slow to germinate and slow to reach transplantable size. Unless you have a dedicated space for starting plants indoors under artificial light, it's probably best to use commercially produced plants, which appear in garden centers at the proper planting time in early spring.

You can reduce germination time by soaking the tiny seeds overnight in lukewarm water before you plant them. Fill small pots with soil-less growing mix, and water thoroughly. Keeping the soil moist is crucial to good germination and subsequent development. Sprinkle the seeds thinly on the pots, and barely cover them with vermiculite. Water the pots again to settle the seeds, and place them at 65°F (18°C). Germination may take 3 weeks, especially if you didn't presoak the seeds. When most of the seedlings have emerged, thin them to leave only the strongest plant in each pot. After thinning, water with a balanced soluble fertilizer solution. Feed every 2 weeks until you move the plants to their permanent location in the straw bale garden. Transplant any time after they reach 6 inches (15.25cm) tall.

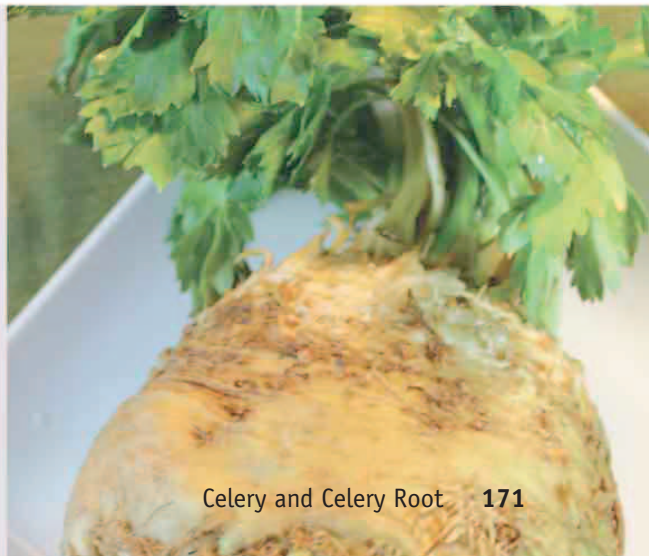
HARVESTING, STORING, AND PRESERVING

Harvest individual celery stalks as you need them, and allow the plants to continue growing. If you take only one stalk per plant, you can harvest once a week. When the season comes to an end, cut the entire plant. Trim off any damaged outer stalks and the tips of the leaves, wrap the entire head in plastic wrap, and store in the refrigerator for up to a month.

Pull celery root when the roots have reached the diameter of a softball for best quality. Trim off all but the innermost leaves, and remove any long roots. Try to leave the skin covering the rootstock intact. Rinse off any debris; dry the root with a kitchen towel; and store in moist, cool conditions for up to 3 months.

SPECIAL TIPS

Whole heads of celery are usually offered in the grocery, but you have the luxury of harvesting individual stalks as you like. Cut or break one stalk from each of several plants to prepare tonight's dinner, leaving the plants to produce more from the inner "heart."



Chard, Swiss



Swiss chard is the same botanical species as beets, but it differs in several important ways. Swiss chard does not form the sweet, swollen root beets do. Instead, it's grown for its succulent leaf stalks and foliage. The flavor of the stalks is reminiscent of beets, although not as sweet, while the foliage works well as a cooked green, either on its own or in combination with other cool season greens.

WHEN TO PLANT

The principal difference between Swiss chard and beets is that although beets can be planted and harvested in succession throughout the growing season, Swiss chard is best planted in early spring. It continues to grow throughout the summer, providing a periodic harvest of the outer stalks from each plant.

Sow seeds about 2 weeks before the last spring frost date in your area, using the soil-less growing mix method.

HOW MUCH TO GROW

You can plant Swiss chard closer together than beets because it doesn't need room for an expanding root. Space plants about 2 inches (5cm) apart each way. You can get 60 to 70 plants into a single bale, which should suffice for most families for the entire season.

PESTS AND DISEASES

Swiss chard is seldom bothered by pests, and in a straw bale garden, it's even less likely to attract insects. If you do have damage from chewing insects, try spraying with neem oil.

STARTING YOUR OWN SEEDS

For the earliest possible harvest, you can start Swiss chard seeds indoors. You must have a light source of sufficient intensity, but otherwise the process is simple. The ideal growing temperature is about 65°F (18°C). Use an 18-cell nursery tray, fill with soil-less growing mix, and place two or three seeds in each cell. Cover the seeds with ¼ inch (.5cm) of growing mix, and water thoroughly. Germination should occur within 2 or 3 weeks. The plants will be ready for the garden about a month after germination, so time your planting accordingly. When true leaves appear, thin to one plant per cell. Feed with a high-phosphorus fertilizer after thinning and again at transplant time.

HARVESTING, STORING, AND PRESERVING

Harvest individual stalks of Swiss chard as you need them for the kitchen. Fresh, undamaged stalks with leaves keep in the refrigerator for about a week without noticeable loss of quality. Stalks without leaves may be kept for a longer time in a moist, cold environment.

Because you can harvest Swiss chard over such a long period of time—all season in mild summer areas, spring and fall elsewhere—it's seldom preserved. However, you can pickle the stalks like beets and can the cooked greens like spinach or kale. Cooked greens also freeze well.

SPECIAL TIPS

The “standard” variety of Swiss chard produces pure white stalks and dark green leaves. Plant breeders have succeeded in producing strains of Swiss chard with red, pink, yellow, and orange stalks. These cultivars are all grown the same way if you want to try them. They add a pleasing aesthetic note to the garden, and can brighten a dinner plate, as well.



Chervil



This delicate herb requires cool weather to grow and quickly goes to seed when the mercury rises above 75°F (24°C). On the other hand, it tolerates cold and can live through several degrees of frost. It also grows well in partial shade, making it a good choice for the shady side of a straw bale.

WHEN TO PLANT

Plant chervil seeds about 3 weeks to 1 month prior to the last frost date in your area. The seeds take a while to germinate, but once they sprout, the plants grow relatively quickly to a harvestable size. Sow a second crop late in the season, a month or so before your first frost, for a continuing harvest throughout the winter and the following spring. The plants stop growing when the weather gets really cold, but they bounce back each time you have a warm spell. Where winters are severe, the plants may not resprout until early spring.

HOW MUCH TO GROW

One or two chervil plants should be sufficient for most families' needs. Because the plants are shade tolerant, you can use them to fill nooks and crannies here and there in the straw bales. The herb makes a good companion for carrots, onions, and lettuce.

PESTS AND DISEASES

Chervil appears to have no significant pest or disease problems. Because it prefers cool temperatures, insects have mostly entered winter dormancy before chervil really gets growing well.

STARTING YOUR OWN SEEDS

It's easy to start chervil from seeds, and doing so gives you nearly perfect plants and an early harvest. Don't start seeds in a cell tray and shift to pots, because this could result in premature bolting, or flowering and seed production.

Fill individual pots with soil-less growing mix and sow a few wirelike chervil seeds on the surface of each one. Barely cover the seeds with vermiculite, and water well. It takes 3 weeks or more for the seeds to germinate at normal room temperature. Chervil grows well under artificial light, or even in a south-facing window. When the seeds have germinated, feed them a balanced soluble fertilizer solution. When seedlings have all developed true leaves, thin to one per pot. Keep the plants well watered; no additional fertilizer is needed. When they're about 6 inches (15.25cm) tall, transplant them to your straw bales.

HARVESTING, STORING, AND PRESERVING

Harvest chervil as you need it for the kitchen, cutting individual leaves all the way down to the base. Set cut stems in a glass of water, as if they were cut flowers, and store them at room temperature for up to 3 days. The flavor is always best when the leaves are fresh.

Chervil doesn't dry well, so preserve the flavor either by making a compound butter by combining 1 ounce (25g) chervil per 1 pound (450g) softened butter, or by substituting chervil for some of the other herbs in your favorite pesto sauce recipe.

Or make chervil-infused oil. Holding a bunch of chervil by the stems, immerse the leaves in boiling water for 15 seconds. Remove, rinse, and dry the leaves. Cut off and discard the uncooked stems. Place the leaves in the top of a double boiler and cover with about 1 inch (2.5cm) of any cold-pressed oil. Set the pan over simmering water, and steep for 15 minutes. Remove from heat, and cool to room temperature. Strain the oil into a clean storage bottle, and refrigerate.

SPECIAL TIPS

Because of its cold tolerance, chervil is a good plant to grow under the cover of a plastic "greenhouse" in your straw bale garden. If you have a T-post and wire trellis support, you can easily cover chervil plants for a continuous harvest all winter. Because it grows well with almost any other crop, you can plant it as part of a mixed winter salad garden.



Endive, Belgian and Radicchio



Belgian endive is grown in the cool season garden for forcing later, while radicchio produces its red-purple and white heads while still in the garden.

WHEN TO PLANT

Schedule your planting so the endive can mature around the first fall frost date. On average, about 90 days are needed for seedlings to produce a crop. Germination requires 1 or 2 weeks. So to have the crop by October 15, sow seeds by July 1.

Use the soil-less growing mix method, and start seeds directly in the bales. If summer weather is hot, be sure to water the seeds regularly to prevent the thin layer of growing mix from drying out. When the seeds have germinated and have extended roots into the bale, you can pay less attention to watering.

HOW MUCH TO GROW

One bale with about six plants of either type of endive should be sufficient for the average household. Either crop keeps well if properly stored, so succession planting is unnecessary.

PESTS AND DISEASES

Pests and diseases are rare with either form of endive, although nonspecific chewing insects may attack the tender young leaves. Control any infestation with neem oil and soap spray.

One problem that may arise is crown rot, the result of excessive moisture standing in the crown of the leaves. Avoid this issue by taking care to water only the bale, not the foliage. After a rain, shake the plants to dislodge any water standing on them.

STARTING YOUR OWN SEEDS

You can start endive seeds indoors and move them to your garden after about 6 weeks of growth. If your home is air conditioned, this approach might be more successful than sowing seeds outdoors during hot summer weather. Fill an 18-cell nursery tray with soil-less growing medium, scatter a few seeds on the surface of each cell, cover with a thin layer of vermiculite, and water. Keep the flat at normal room temperature, and provide bright artificial illumination. Expect germination in about 10 days. Feed the seedlings at this point using a balanced soluble fertilizer solution, and feed again after thinning. When the plants have at least one set of true leaves, snip off the weaker plants with scissors, leaving one plant per cell. Transplant to the straw bales after the seedlings are 30 days old.

HARVESTING, STORING, AND PRESERVING

Harvest Belgian endive by digging all the plants out of the bale at the end of the growing season. Remove the foliage just above the crown, trim the roots to a uniform size, wrap in newspaper, and refrigerate. When you're ready to force a crop of endive, place several of the stored roots upright in a bucket, supporting them with dampened sand or growing mix. Keep them moist, and in about 3 weeks, the characteristic elongated "heads" will emerge. Cut these off at the soil level. Well-grown roots can produce a second crop.

In the case of radicchio, leave the plants in the bales, but cut off the foliage at crown level at the end of the growing season. This forces the plant to resprout, producing the characteristic heads. Cut heads as needed for the kitchen, or harvest them all and store under cool, moist conditions for several months.

SPECIAL TIPS

Radicchio tolerates a light frost and might be the better choice for gardeners with limited space. You can crowd the plants at eight to a bale and leave them in place to be picked in early winter. The leaves bring a fresh, slightly bitter note to salads of cool season greens.



Endive, Curly and Escarole



Curly endive is frequently referred to by its French name, “*frisée*,” and escarole may be called “Batavian lettuce” in some circles. All are a species of endive and closely related to radicchio and Belgian endive.

Growing methods for either of these crops resemble those for other cool season greens.

WHEN TO PLANT

Unless you’re growing a heat-tolerant cultivar (more on these in a minute), time your plantings so the crop matures in cool weather. Plants perform poorly when the temperature is greater than 85°F (29.5°C). An average of 90 days is needed to produce a crop, so count backward from the first frost date in fall to determine the proper time for summer sowing. Allow 2 additional weeks for germination.

HOW MUCH TO GROW

Either of these types of endive is usually included in mixed greens for salad, so your preferences for how much of a slightly bitter note you want in your salad mix determines how much to plant. A single bale of straw holds at least 6 and as many as 12 plants, depending on the variety.

PESTS AND DISEASES

Especially when grown in straw, largely out of reach of snails and slugs, escarole and endive are rarely bothered by pests.

On the other hand, crown rot can be a significant problem for curly endive, the result of water standing in the crown of leaves. You can avoid this by not wetting the foliage when watering the plants.

It's common practice to gather the outer leaves up around the developing rosette and tie them in place with string. This not only helps prevent water reaching the "heart" of the plant, but also blanches the leaves to pale and tender perfection.

STARTING YOUR OWN SEEDS

To start your own seeds indoors, fill an 18-cell nursery tray with soil-less growing medium, scatter a few seeds on the surface of each cell, cover with a thin layer of vermiculite, and water. Keep the flat at normal room temperature and provide bright artificial illumination. Expect germination in about 10 days. Feed the seedlings, using a balanced soluble fertilizer solution, at this point and again after you thin them. When the plants have at least one set of true leaves, snip off the weaker plants with scissors, leaving one plant per cell. Transplant the seedlings to the straw bales after they're 30 days old.

Where summers are hot and humid, starting seeds in an air-conditioned space gives better results than sowing them directly in the garden.

HARVESTING, STORING, AND PRESERVING

Harvest the entire head of either curly endive or escarole as needed for the kitchen. If the heads are carefully rinsed, drained well, and stored under refrigeration in an enclosed container, they keep well for several weeks.

As a general rule, neither of these endives is preserved by freezing, although you can create fermented products resembling sauerkraut from the leaves. Search your local library or online for methods for such kitchen adventures.

SPECIAL TIPS

It's worth noting that heat-tolerant forms of escarole have been developed. Look for them if you live where summers are hot and humid. It's possible to extend the growing season for escarole at least a month at either end by using one of these varieties.



Greens, Miscellaneous

Most greens grow best during the cool season. Mizuna, tatsoi, dandelion, corn salad, and a few others are all great choices for growing in straw bales. They thrive in the internally generated heat early and late in the season, and straw provides the perfect environment to encourage plenty of succulent green leaves.

WHEN TO PLANT

Where the weather warms up in a hurry as spring begins, fall planting is the best approach. Gardeners in mild summer areas can enjoy these greens all season. Most of these greens mature in less than 2 months, and all are cold tolerant. Time your plantings so your plants mature before a hard freeze in autumn and before the daytime temperature reaches 80°F (26.5°C) in spring. Make successive plantings weekly to avoid a glut.

HOW MUCH TO GROW

One straw bale can accommodate about 35 mizuna, tatsoi, dandelion, or corn salad plants. You also can use the ends and sides of bales because greens can tolerate a little shade. Be prepared to replant after each harvest if your climate provides a long enough cool season.

PESTS AND DISEASES

The chief pests of green crops are typically aphids and flea beetles. Aphids are likely to appear if the plants are stressed from lack of water, while flea beetles seem to attack plants that are suffering in too warm conditions. Either pest is best avoided rather than treated. Cover the crop with a floating row cover to exclude them. If you've installed a T-post and wire trellis support, using the row cover is easy.



STARTING YOUR OWN SEEDS

You can start mizuna, tatsoi, dandelion, or corn salad seeds indoors under artificial lights. In a 36-cell nursery flat filled with soil-less growing mix, drop two or three seeds on the surface of each cell, cover thinly with vermiculite, and water well. Germination depends on the variety and can range from 1 to 3 weeks. When all the seeds of a given type have germinated, thin to one plant per cell and feed them with a balanced soluble fertilizer solution. Plants will be ready to transplant after 2 weeks of growth. Set them in bales with about 2 inches (5cm) between them each way.

HARVESTING, STORING, AND PRESERVING

Harvest leaves or entire plants as you need them. Add small, tender leaves to salads. Mizuna and tatsoi also can be used in stir-fries, and dandelion and corn salad greens are nice steamed like spinach.

It is possible to cook and freeze any of these greens, but most people use them freshly picked.

SPECIAL TIPS

You can harvest all leafy greens leaf by leaf for the longest possible growing season. Don't take more than a third of the foliage from any one plant, though. Most greens are nice in salads, but dandelions and corn salad are also good cooked.



Greens, Mustard

Mustard greens bring a spicy flavor to salads and make some of the best cooking greens available. They also mature a crop quickly, making them a great choice for any garden.

WHEN TO PLANT

Direct seed all mustard varieties in early spring, about a month before your last frost date, and again in late summer or fall. Use the soil-less growing mix method, cover seeds with ¼ inch (.5cm) of vermiculite or growing mix, and keep the planting area well watered. Thin seedlings to stand 6 to 8 inches (15.25 to 20.25cm) apart when true leaves have developed. Most cultivars mature in about 40 days. Warmer weather results in harsh flavors and toughness.

HOW MUCH TO GROW

One bale holds about 35 mustard plants, enough for several pickings or about 20 servings. Much depends on the type of mustard you choose—some are large and vigorous, while others remain small.

PESTS AND DISEASES

Mustards are attacked by aphids and flea beetles, but generally such infestations are the result of stress on the plants. Such problems are best avoided rather than trying to treat after an infestation has developed. The rapid maturity time for mustards leaves little room for the plants to recover, even from a successful treatment. Instead, cover the plants with a floating row cover. Using the T-post and wire trellis supports makes installing the row cover simple.



STARTING YOUR OWN SEEDS

Because mustard greens grow so quickly, most people sow seeds directly in the garden. However, you can start seeds indoors and move them outside when they're small. Allow about 1 week for germination to occur and then 2 weeks for the plants to grow before you move them to the bales.

Fill a 36-cell nursery tray with soil-less growing mix, and water thoroughly. Sprinkle a few mustard seeds into each cell, and cover them with about ¼ inch (.5 cm) of vermiculite or growing mix. Water the flat again to settle in the seeds.

As soon as all the seeds have germinated, feed the plants with a balanced soluble fertilizer solution. Once roots are visible through the drainage holes, get them into the bales as soon as possible.

HARVESTING, STORING, AND PRESERVING

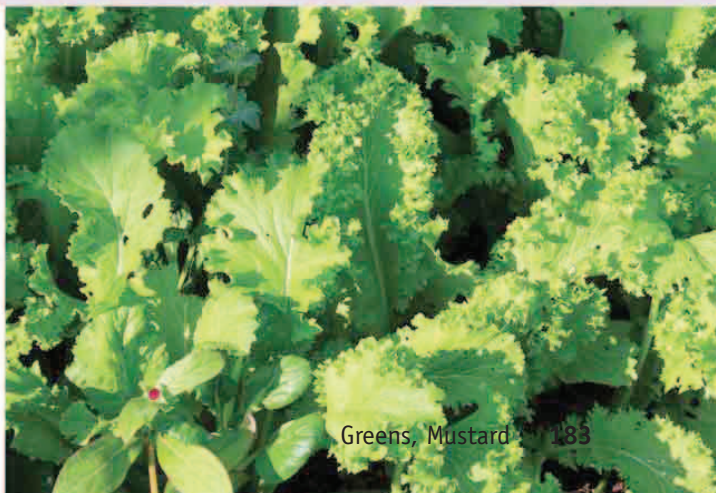
Harvest mustard greens as you need them. If you take only a few leaves from each plant, more will grow for a later harvest. You can generally harvest each plant three times, taking about a third of its foliage each time. At the third harvest, remove the entire plant.

Rinse freshly harvested mustard greens, dry in a salad spinner, and store them in plastic bags in the refrigerator for up to a week.

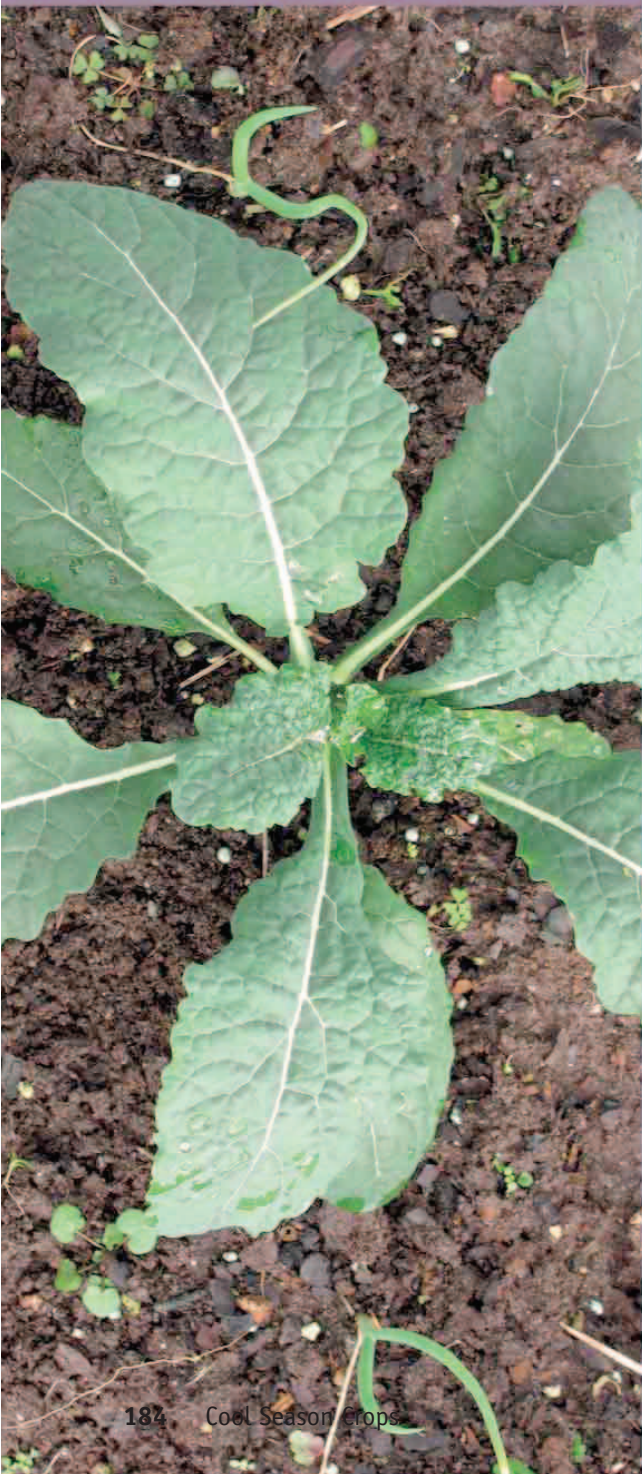
To freeze greens, remove the stems and chop the leaves coarsely. Drop them into rapidly boiling water, and stir. When the water returns to a boil, set a timer for 3 minutes. When the timer chimes, drain the greens, rinse them well under cold running water, and drain again. Place the greens in appropriate containers, and freeze.

SPECIAL TIPS

For variety in your garden, look for mustard cultivars with red leaves. They turn green when cooked, but the coloration helps make the garden more decorative. Or consider growing mustard in the spaces between bales—a good spot for a few seeds of any leafy green crop.



Kale



Kale was long relegated to relative obscurity in the culinary world—until people began to discover its many virtues. Nutritious kale is among the most easily grown members of the vast cabbage clan. Two species are available, the traditional green variety and the red, or “Russian” kale, which adds a decorative touch to your garden and a sweet taste to your plate.

WHEN TO PLANT

It’s essential that kale mature in cool weather, or the flavor will be harsh and the foliage tough. On average, kale requires 65 days from germination to harvestable size. Allow an additional 2 weeks for seeds to germinate by counting backward from 2 weeks beyond your first fall frost date. Kale tolerates light frost without damage.

HOW MUCH TO GROW

Kale is a good crop for harvesting leaf by leaf, giving you greens over a long season. One straw bale accommodates six standard-size plants. If you select one of the dwarf cultivars, you can fit 12 plants per bale. This should be sufficient for the typical household.

Kale freezes well, so if you want to preserve some this way, you can plant a second bale for a larger harvest.

PESTS AND DISEASES

The major insect pest of kale, as with all the cabbage family members, is the cabbage butterfly, *Pieris rapae*. The best control method currently available is the application of Bt, which causes the insects to develop a fatal disease. Bt must be reapplied on a regular basis to remain effective, and there have been scattered reports of the caterpillars developing resistance.

Another surefire method of control is to cover the crop with a floating row cover. Using the T-post and wire trellis support arrangement lets you easily shield your crop.

When grown in straw, kale is subject to few problems other than insect attack. When the weather turns cold, insects go dormant and you can remove the row cover.

STARTING YOUR OWN SEEDS

You can start both green and red kale varieties indoors under lights. Use an 18- or 24-cell tray in a standard nursery flat and fill with soil-less growing mix. Place two or three seeds in each cell, water, and place under the lights, maintaining a temperature average of 65°F (18°C). Seeds typically germinate in 2 weeks' time. When true leaves appear, thin to one plant per cell, and feed with a soluble balanced fertilizer after thinning. When the plants have at least two sets of true leaves, after about 30 days of growth, they're ready to move into the bales.

HARVESTING, STORING, AND PRESERVING

For fresh use, pick individual kale leaves, cutting the stem close to its base. Take only one or two leaves from each plant. Use them the same day, or place the stems in a glass of water as if they were cut flowers, and store in the refrigerator for up to a week.

Very young leaves are tender enough for salads, but you're more likely to cook the majority of your kale harvest. Kale responds well to either steaming or stir-frying. Or you can dry leaves in a warm oven for kale chips.

For long-term storage, partially cook the kale for at least 3 minutes in a small amount of water. Cool quickly to room temperature, place in suitable containers, and freeze. The taste and texture of frozen kale are as good as that of freshly cooked.

SPECIAL TIPS

Kale cultivars can be especially decorative, but avoid purchasing the ones intended solely for decorative use. They are interesting and attractive in the winter garden, but they're far too tough and harsh-tasting to be eaten.

Instead, select from among the kale cultivars that have "curly" or "ragged" as part of the name, along with those that have red coloration in the leaves. Growing a mixture of these types in the same bale produces a lovely fall and early winter display.



Kohlrabi



Another member of the cabbage family, *kohlrabi* literally means “cabbage turnip.” With this plant, the swollen base of the stem is your primary goal, not the leaves or any other part.

Kohlrabi matures a bit sooner and is somewhat easier to grow than other members of its family.

WHEN TO PLANT

Fast-maturing kohlrabi, which can produce a crop in as little as 45 days, is best for spring planting. Varieties that require longer are a better choice for fall growing. The temperature range for kohlrabi is 45°F to 75°F (7°C to 24°C). Count backward from the first fall frost date to determine the summer transplanting time.

For spring planting, transplant started plants 2 or 3 weeks prior to your last frost date. Be prepared to protect them from a late freeze, if that’s common in your area.

HOW MUCH TO GROW

Each kohlrabi plant yields a baseball-size stem, enough for two servings. If you enjoy the flavor of cooked cauliflower, you’ll want to grow an entire bale—six plants—or more of kohlrabi.

PESTS AND DISEASES

Like other members of the cabbage family, kohlrabi is susceptible to the cabbage butterfly, *Pieris rapae*. The simplest strategy for dealing with this pest is to cover the plants with a row cover from the time you plant until they’re ready to harvest to prevent the adult butterfly access. A floating row cover also provides a bit of frost protection for your plants.

STARTING YOUR OWN SEEDS

If you have a sufficiently well-lit indoor space, you can start kohlrabi plants from seeds. Beginning 1 month to 6 weeks before your desired transplant date, fill an 18-cell nursery tray with soil-less growing mix. Sow two or three seeds per cell and cover with a thin layer of vermiculite or growing mix. Water well, and place in a cool, well-ventilated location. The average temperature should be around 60°F (15.5°C). When the plants emerge in about 10 days, feed them with a balanced soluble fertilizer. Once true leaves appear, use scissors to snip off the weaker plants at soil level, leaving one plant per cell. Transplant when they have two pairs of true leaves.

HARVESTING, STORING, AND PRESERVING

Harvest the entire plant. Cut off the leaves, leaving ½ inch (1.25cm) of stalk attached to the swollen base. Trim off the taproot, and rinse the kohlrabi under cold water. Use immediately, or dry thoroughly and store in a plastic bag in the refrigerator for about a month.

You can store kohlrabi in the freezer, too. Peel and cut the kohlrabi into bite-size pieces, drop into boiling water, and cook for 3 minutes after the water returns to a boil. Drain, plunge into cold water to stop the cooking, and drain again. Place in appropriate containers, and freeze.

Kohlrabi can be mashed like potatoes, added to soups and stews, and sautéed as a side dish. It also works well in gratins and casseroles where its nutty, sweet flavor goes well with cool season root vegetables like carrots and turnips.

SPECIAL TIPS

For variety, look for kohlrabi cultivars that mature to a deep purple color. They're usually long-maturing forms best for fall cropping. Both green and purple kohlrabi can be grown together in the same bale. Doing so gives you a longer harvest time, owing to the differing maturity dates.



Kohlrabi

Leek

With some prior planning, you can have leeks for most of the growing season regardless of where you live. That said, you get the best quality when the plants are allowed to mature in cool weather.



WHEN TO PLANT

You can transplant leeks to the garden a month before the last frost date and replant up until about 60 days before the first frost of autumn. I don't recommend starting leeks from seed directly in the garden. It's better to start seeds separately or purchase plants and transplant them.

HOW MUCH TO GROW

A bale of straw easily accommodates about 25 leeks. Most dishes call for only one or two, so you can have a decent crop from two bales. Many gardeners like to plant leeks at double density, spacing them about 2 inches (5cm) apart each way in a bale. When the plants are about the diameter of your finger, you can harvest every other one for "baby" leeks, leaving the rest to mature.

PESTS AND DISEASES

The absence of soil in a straw bale garden means disease issues rarely arise. Not many insect pests are willing to try leeks, and in fact, growing them among other vegetables can help deter some of the chewing insects that can attack an assortment of crops, the ones we refer to as "nonspecific" pests.

STARTING YOUR OWN SEEDS

Leeks are easy to start from seed. To have transplants ready in March, you need to begin in January.

Fill a container about 6 inches (15.25cm) in diameter with soil-less growing mix and scatter leek seeds on top. Cover the seeds with a thin layer of vermiculite, water well, and place a plate or board on top of the pot to retain moisture. Check frequently and remove the cover as soon as you see foliage emerging. Do not allow the pot to dry out. When most of the seeds have germinated, feed them with a balanced soluble fertilizer solution, and repeat every 2 weeks. Keep the soil moist but not soggy. Provide as much light as possible.

When many of the seedlings are the diameter of a pencil, knock the entire clump out of the pot, and separate the plants, choosing only the largest, sturdiest ones for planting. Using scissors, trim the roots to 2 inches (5cm), and clip off the top third of the leaves. Use your finger to poke a hole in the bale, insert a plant, bury it halfway, and fill the hole with a little growing mix. When the bale is full, water well.

HARVESTING, STORING, AND PRESERVING

Harvest leeks when they're the size you desire, but remove all plants from the garden before a hard freeze. If the roots freeze in the bales, they'll split and be ruined.

Pull the plants, remove most of the top growth, and wash off any debris. Drain well and store under moist, cool conditions. Properly stored roots keep for 3 to 6 months.

You also can freeze leeks. Prepare them for cooking, blanch briefly in boiling water, and freeze in appropriate containers.

SPECIAL TIPS

Growing the very best leeks requires a small deviation from the usual straw bale garden approach. After the plants are about 1 inch (2.5cm) in diameter, cover the bottom third of the stalk with more straw so only some of the foliage protrudes. After another month of growth, repeat this procedure, covering all but about the top third of the foliage with additional straw. (You also can use soil, bark, or some other loose material instead of straw.) This technique results in long, white roots—the chief aim of leek production.



Lettuce



Hundreds of lettuce cultivars are available. Some are sufficiently heat tolerant and can be grown during warm weather, but the majority grow best with mild days and cool nights.

Looseleaf lettuces never form a head, while loosehead types show the beginnings of a tighter inner leaf cluster. Butterhead lettuces have short, rounded leaves and form neat little heads with a soft texture. Romaine lettuces produce elongated heads tightly packed with leaves, while crisphead types form the familiar crunchy ball of leaves. All require the same basic care.

WHEN TO PLANT

Direct sow lettuce or transplant it into your straw bale garden a month or so before the last spring frost. For a continuous supply, sow or transplant a few plants each week. The last plants should mature before daytime temperatures exceed 80°F (26.5°C). Heat-tolerant varieties continue to grow and maintain good quality at 90°F (32°C) or below.

HOW MUCH TO GROW

A single bale holds 18 to 20 clumps of lettuce, or more if you use a “cut and come again” harvest method. Each head or clump of lettuce should provide two to four servings of salad. You also can tuck lettuce plants into unused parts of the straw bale garden. They produce just fine when sticking out the side of a bale.

PESTS AND DISEASES

Lettuce plants growing in straw bales are well protected from their chief garden predators, snails and slugs. Lettuce also is prone to water stress, another nonissue in a straw bale garden. Aphids, a common pest that may appear when plants are stressed by heat, are easy to knock off the plants with a spray of water from the garden hose.

STARTING YOUR OWN SEEDS

Lettuce is an excellent choice for starting indoors under artificial light. Fill a 36-cell nursery tray with soil-less growing mix. To have plants of varying ages, sow only part of the tray each week. Moisten the soil and drop two or three seeds on the surface of each cell, and using a pencil eraser, gently press the seeds into the soil, barely making a dent in the surface. The seeds need light to germinate and won't sprout if buried too deeply. Water the flat again to settle the seeds, and set it under the lights. At room temperature, germination is likely to occur within 48 hours. When the first group of seedlings develop true leaves, sow another group of cells. Keep the plants growing quickly by leaving the lights on at least 10 hours a day. Feed every 2 weeks with a balanced soluble fertilizer solution, and don't allow the growing medium to dry out. When roots protrude from the drainage holes in the cell tray, the plants are ready to transplant. Carefully remove them to avoid disturbing the others.

HARVESTING, STORING, AND PRESERVING

Harvest lettuce any time after the leaves are large enough to use. Some gardeners cut the plants off with scissors just above the soil line and allow them to resprout for a second, and sometimes a third, crop. This method is called "cut and come again" and works best for looseleaf and loosehead lettuce varieties.

For other varieties, cut the head at ground level, remove any damaged outer leaves, and plunge the head into cold water to cool it down quickly. Drain well and store loosely covered in the refrigerator for a week or more. You also can separate the leaves and dry them in a salad spinner before storing.

Lettuce is almost always eaten fresh and raw, but it can be blanched and frozen for later use in soups.

SPECIAL TIPS

Among lettuce cultivars, those with red foliage or with ruffled foliage are the more cold tolerant. Romaine types have the greatest heat tolerance. Select varieties according to the expected warmth of the season in which you intend to plant them.



Pea, Shelling



Like other legumes, peas are easy to grow and thrive in a straw bale garden. Fresh shelling peas are becoming harder to find in the market, but that's no problem when you can grow fine-quality peas yourself with little effort other than picking.

WHEN TO PLANT

Peas require cool weather, although they do mature successfully when the weather warms after a spring planting. About 2 weeks prior to the last spring frost is the recommended spring planting date. But you can start about 1 week earlier, thanks to the self-generated heat of straw bales.

For a fall planting, count back 70 days from your first anticipated frost date to determine the planting date. Although the vines are cold tolerant, if the pods freeze as they're maturing, they might be ruined.

Use the soil-less growing mix method, and plant the seeds by hand 1 inch (2.5cm) deep, spacing them 2 inches (5cm) apart. If you've installed a T-post and wire trellis support, plant directly under the wires and run the strings vertically between the bottom and the top cross piece to give the peas something to climb. Even so-called "no trellis" peas do much better with support.

Peas are drought tolerant and need not be fertilized, so after you plant them, you can just watch them grow.

HOW MUCH TO GROW

You can fit about 24 pea plants in one straw bale. Two bales provide 3 to 5 pounds (1.5 to 2.5kg) of peas, shelled. Peas freeze easily, so you might want to allocate more space if you want some for later.

PESTS AND DISEASES

Peas are subject to a number of viruses and fungal pathogens, but these are unlikely to be a problem in a straw bale garden. If you see plants turning yellow and dying for no apparent reason, try a different pea variety the next season. Once a virus takes hold, there's not much hope for the crop.

STARTING YOUR OWN SEEDS

Start peas indoors in small biodegradable pots. Fill the pots with soil-less growing mix, and use your finger to poke three seeds 1 inch (2.5cm) deep in each. Water well, and place in a brightly lit location at room temperature. Expect seedlings to emerge in about a week. You can keep them in the pots until they show signs of wanting to climb, but get them in the bales promptly once they do so. Don't worry about thinning; just set the pots about 6 inches (15.25cm) apart in the bale.

HARVESTING, STORING, AND PRESERVING

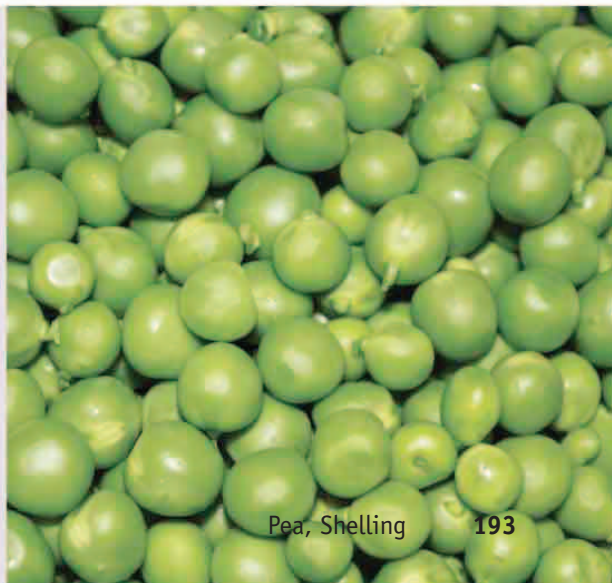
Pick peas when the pods have filled out but before they begin to turn yellow. Yellow pods indicate overmature peas that have lost a lot of their sweetness. Pick and discard them to keep the plants bearing. Try to find and remove each pod every time you pick to encourage additional blooms.

Freshly harvested peas keep a few days in the refrigerator, but the quality is best if they're used or preserved the day they're picked.

Freezing is the easiest method for preserving shelled peas. After shelling, drop the peas in boiling water for 3 minutes, drain well, and plunge into an ice bath. Drain thoroughly, transfer to appropriate containers, and freeze. Properly prepared frozen peas are almost as tasty as fresh ones.

SPECIAL TIPS

Plan on following your spring pea planting with cucumbers. Plant the cukes just as the peas are beginning to form, and by the time you've picked all the peas, the cucumbers will be climbing. At the end of the summer, simply remove and compost the whole mass of foliage and stems. If you use a biodegradable material such as sisal twine for the trellis, you can compost it, too.



Pea, Snow and Snap

If you like lots of fresh peas for salads and stir-fries, you can't beat snow and snap peas for flavor.



WHEN TO PLANT

Snow peas do best when they can mature during cool weather, but they also yield good results with an early spring sowing in regions where the growing season is long. Although the vines tolerate light frost, the crop could be damaged by a freeze. About 70 days are required for the first pods to mature, and plants can normally be picked for about 2 weeks. Count back 85 days from the date of your most likely first freeze to arrive at a fall planting date.

Sow seeds in spring about 6 weeks prior to the last spring frost date in your area. Use the soil-less growing mix method, and with your finger, poke individual seeds about 1 inch (2.5cm) deep in the mix, spacing them 2 inches (5cm) apart. If you have a trellis support running down the center of the garden, plant the seeds just on either side of the trellis. Install strings or nylon netting on the trellis support for the peas to climb on.

HOW MUCH TO GROW

A single bale accommodates about 30 pea plants, and they don't seem to mind crowding. This many plants gives you about four servings every few days during the harvest season.

PESTS AND DISEASES

Insects don't seem to be a problem for peas that are growing well. The plants are subject to a number of virus diseases, but these are unlikely in a straw bale garden. If you do have problems with yellowing or spotted foliage, it's best to destroy the plants and try again next season with a different variety.

STARTING YOUR OWN SEEDS

If you start them indoors in winter, peas need about a month to germinate and grow to a sufficient size for transplant. Use biodegradable pots to avoid disturbing their roots when moving them to the bales.

Sow three seeds 1 inch (2.5cm) deep in pots of soil-less growing mix, water, and place under bright artificial light. Expect germination within a week at typical room temperature. You don't have to thin the pots. Space each group of three plants about 4 inches (10cm) apart in the bale. Transplant when tendrils appear.

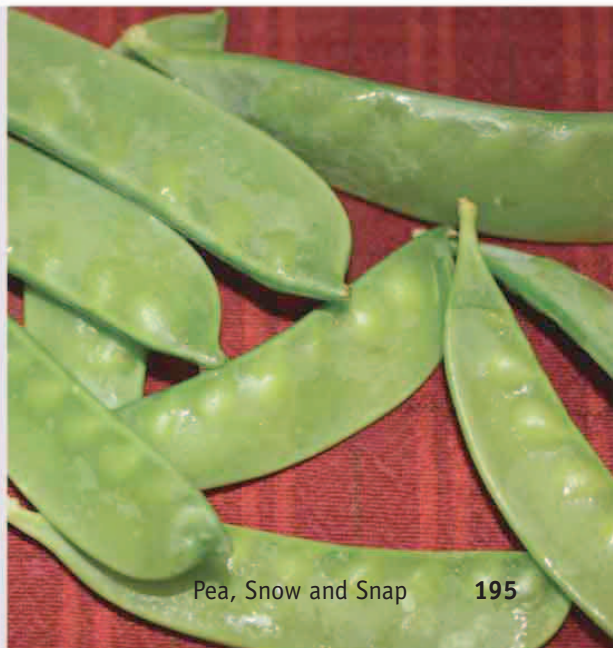
HARVESTING, STORING, AND PRESERVING

Harvest peas when they reach the size you prefer. For snow peas, this will be before the seeds have begun to inflate the pods. Snap peas should be a bit fatter. If you break open a pod, the seeds should be spherical, not flat, and bright green. Perhaps the most definitive way to tell is to eat a pod. If the taste is sweet and bright, they're ready. Avoid letting peas get too mature—they'll become starchy and tough.

Snow and snap peas are best eaten fresh. Blanching them in boiling water before freezing is necessary, but it's difficult to determine the proper cooking time, and overblanching results in a poor texture after freezing. If you want to try freezing at home, choose pods as uniform in size as possible, blanch for no more than 1 minute, drain, plunge into ice water, and drain again before freezing.

SPECIAL TIPS

All snap pea varieties are artificially created hybrids between specific strains of edible-podded and nonedible-podded peas. From time to time, individual plants in a given batch of seeds may display traits of the ancestral types. If flat-podded "snow" peas show up among your snap peas, don't despair. Simply harvest and use them. They're the product of a reverted plant. There should be no more than 5 percent reversion in any given batch of seeds.



Potato



Potatoes had been cultivated in the New World for centuries when the Spanish explorers first arrived. Modern potatoes exist in numerous varieties, all of which are the result of a long history of hybridization and selection from among the several natural species. Although frost intolerant, potatoes do best in cool weather. In frost-free areas, they can be grown as a winter crop. Farther north, they can be planted for summer or fall harvest. Research the potato varieties widely grown in your region; they tend to be adapted to your area's specific conditions.

WHEN TO PLANT

Potatoes mature in anywhere from 6 weeks to 4 months after the leaves emerge from the ground. The average first frost date in your area determines the best choice of maturity dates. Where the weather warms up quickly in spring, fast-maturing potato varieties yield the best results. Where summers are cool, spring-planted potatoes can grow until fall.

Maturity dates may also correlate with the keeping characteristics of the potato tubers. Slow-maturing varieties tend to have less water and keep better than the early ones.

HOW MUCH TO GROW

For most potato varieties, you'll get about 4 pounds (2kg) of potatoes per bale. If you choose a variety that's a good keeper, you might want five bales to fully stock your pantry. Space limitations will ultimately determine your harvest.

PESTS AND DISEASES

Potatoes are subject to all the same pests and diseases that plague the other members of the tomato family. Flea beetles attack potatoes, especially during cool weather. Covering the crop with a floating row cover is the best way to deal with this problem. If you've installed a T-post and wire trellis, you can easily drape the cover over the plants. Tomato hornworms are also deterred by a row cover, or you can remove them by hand.

Foliar diseases of potatoes are transmitted in the soil, except for tobacco mosaic virus. Do not permit tobacco use near your potato plants, and insist that smokers wash their hands well before touching the potatoes.

STARTING YOUR OWN SEEDS

Only rarely are potatoes grown from seed, and this is usually part of a plant breeding program. Instead, potatoes are grown from small tubers from the previous season. You can save your own or purchase certified stock from a garden center or catalog. Using tubers from the grocery store is not recommended.

HARVESTING, STORING, AND PRESERVING

When blooms appear on the plants, you can expect to find “new” potatoes in the straw below. You can carefully dig a few of these for immediate use, or leave all the potatoes to mature and harvest the entire crop at once.

As the tubers mature, potato vines will begin to yellow and fall over. When they all have, harvest the crop. You can cut off the foliage from the first plants to mature, but leave enough around the base to keep the soil cool while the remainder of the crop is coming along. Break open the bale to remove all the tubers when the time comes.

Spread out freshly harvested potatoes on newspapers in a shady, sheltered spot for a few days to cure before storage. After about a week, the skins should be toughened and dry and less prone to damage. When they reach this point, you can transfer them to baskets. Store your potatoes in a cool, well-ventilated place, but not under refrigeration. Refrigerated potatoes become unpleasantly sweet tasting.

SPECIAL TIPS

The vast array of choices among potato varieties means cultivars are available for almost every situation or need—fast-maturing, compact, keepers, and in a rainbow of colors, from pure white to deep blue, some with contrastingly colored flesh.



Radish, Spring



Spring radishes are the familiar red round ones, and the group includes a diversity of sizes, shapes, and colors. You can grow them as a fall crop, too. The designation “spring radish” serves to separate this group from the fall-sown “winter” radishes.

WHEN TO PLANT

Thanks to the internally generated heat of straw bales, you can plant radishes about 6 weeks prior to your last spring frost. They’ll mature in about a month and, therefore, are ideal for succession sowing. Because weather that’s too hot produces harshly flavored radishes, stop planting a month before the anticipated daytime temperature reaches 80°F (26.5°C). You can resume planting radish seeds again as the days cool off in the fall. Plant a few seeds each week until a month prior to the likely first freeze. Even if you need to rescue the last crop from frostbite, you’ll still be able to use the greens.

HOW MUCH TO GROW

A bale produces a nice bunch of radishes—three dozen or so. If you like a lot of radishes, set up two bales and plant half of one every week over the course of a month. Depending on the length of your cool season, you can replant a time or two.

PESTS AND DISEASES

Radishes have no significant pest or disease problems when grown in straw bales. Rarely, nonspecific chewing insects such as flea beetles will attack. Because the plants mature so quickly, it’s better to pull and discard affected ones. If the infestation is light, the plants will produce a crop in spite of the beetles.

STARTING YOUR OWN SEEDS

There's little point in starting radish seeds indoors. For one thing, moving them is likely to result in misshapen, hairy roots. For another, they mature so quickly, it's hardly worth the trouble.

Use the soil-less growing mix method, and either place individual seeds on the mix, spacing them about 2 inches (5cm) apart each way, or scatter them over the entire area. If you take the latter approach, you'll need to thin them later to the proper spacing. If they're not spaced properly by the time true leaves appear, the roots won't develop appropriately.

Cover the seeds with about ¼ inch (.5cm) of vermiculite or growing mix, and water well. They should germinate within a week, and you'll have radishes in about a month.

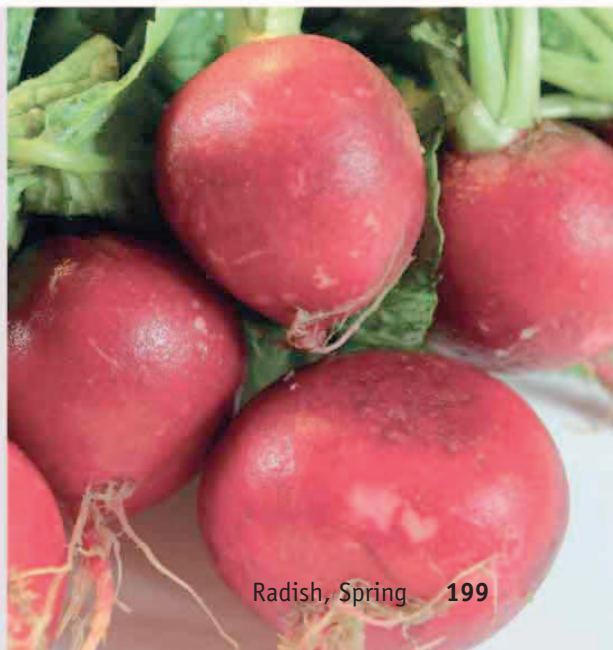
HARVESTING, STORING, AND PRESERVING

Pull radishes when they reach the size and color you anticipated from the description in the catalog or on the seed packet. As with most vegetables, it's better to err on the side of early harvest, as opposed to late. The undamaged tops are also edible in salads, if tender, or as cooked greens if not.

You can pickle radishes, but more often they're eaten raw. They'll keep for up to 2 weeks in the refrigerator in a plastic container. Remove all but 1 inch (2.5cm) of the tops and rinse off any debris before storing.

SPECIAL TIPS

Radishes come in elongated as well as round versions, and the colors available range from white through pink and red to deep lavender. Individual roots can be the size of marbles or as big as carrots. Because radishes are effortless to grow and take up little space, they afford a great opportunity to try varieties you'd never encounter in the grocery store.



Radish, Winter



Winter radishes are an Asian staple that have only in recent years caught the attention of western gardeners. These radishes, different from spring radishes, are grown during fall for storage and use during the following winter. The roots, which can be as large as a softball, keep well under cellar conditions similar to those required for carrots or cabbage.

One of the most popular varieties of winter radish has a pale green outer flesh with a red-purple center, reminiscent of a watermelon. Another one has black skin and a white interior. Still another form is the large, white, carrotlike daikon. All these plants grow well with loose, well-aerated soil, making them ideal for the straw bale garden.

WHEN TO PLANT

Winter radishes are day-length sensitive and should only be planted in fall. Otherwise, you'll get foliage but no roots. Count backward from your first fall frost date, and pay attention to the maturity dates quoted on the seed packet. You should plan to harvest after the first frost but before a hard freeze.

HOW MUCH TO GROW

Unless your interest in these plants is significant, a bale should suffice. Eight of the watermelon-type radishes fit in one bale, whereas the larger daikon needs more room. The length of the fall season also influences the size of the mature plants, so you might want to experiment during the first year to determine what works best in your location.

PESTS AND DISEASES

Flea beetles and aphids are the only significant pests of winter radishes. Unexpectedly warm weather can help bring on an infestation. Be sure to keep the plants well watered to help avoid problems, and use neem oil spray to deter flea beetles. Often, knocking aphids off the plants with water from a hose is effective in controlling them. The cooler the weather becomes, the less of a problem these insects are likely to be.

STARTING YOUR OWN SEEDS

Using the soil-less growing mix method, place two or three seeds in groups on the mix, spacing them about 4 inches (10cm) apart each way. Cover the seeds with about ¼ inch (.5cm) of vermiculite or growing mix, and water well. They should germinate within 1 week to 10 days. As soon as all the seeds have germinated, thin them to eliminate the weaker plants in each spot. If they aren't spaced properly by the time true leaves appear, the roots will never develop appropriately.

HARVESTING, STORING, AND PRESERVING

Harvest the crop after the first frost but before the first hard freeze. Remove all but 1 inch (2.5cm) of the tops, and wipe the roots free of debris. Store them under cold, humid conditions, as in a plastic bag in the refrigerator, for up to 6 months.

These radishes are also often made into pickles. Peel, cut into bite-size pieces, and process according to the recipe. Recipes for pickling radishes, with or without other vegetables, are widely available.

SPECIAL TIPS

The daikon radish may be the most suitable variety for backyard straw bale gardeners. Experience has shown that it produces a usable crop when harvested early or later in the season, giving you much more leeway in choosing a harvest date than with the watermelon type.



Spinach



Among the most nutritious of the leafy green crops, spinach is also one of the easiest to grow when the weather remains cool. Although “heat-tolerant” varieties are available, the designation does not mean they withstand temperatures above 85°F (29.5°C).

WHEN TO PLANT

Spinach can be planted in early spring for harvest before the weather warms, and again as a fall crop in areas where summers are hot and humid. In cooler regions, it can be grown successively all season long, and in mild winter areas it can be grown as a winter crop.

Plant a spring spinach crop about 6 weeks prior to the last spring frost date in your area. Plant your fall crop when the daytime temperature can be reliably expected to remain below 85°F (29.5°C). Spinach tolerates frost, provided the plants have several pairs of true leaves by the time freezing weather arrives.

Using the soil-less growing mix method, sow spinach seeds two or three at a time, spacing the groups 4 inches (10cm) apart each way. Water well, and expect germination within 2 weeks. When true leaves appear, cut off the weaker seedlings at the soil line, leaving the healthiest plant at each position.

HOW MUCH TO GROW

A single straw bale should hold 60 spinach plants or more, which, if harvested a leaf at a time for salads, should provide eight servings or more over the course of the season and a large final harvest. For a continuous supply throughout the season, sow multiple bales in succession, 2 weeks apart.

PESTS AND DISEASES

Spinach falls victim to powdery mildew if the weather is too cloudy and damp. If this happens, pull every other plant to permit more air circulation around them. Pests rarely bother spinach. Sprinkling the plants with diatomaceous earth, available in small bags at garden centers, is an effective deterrent.

STARTING YOUR OWN SEEDS

To start spinach indoors, use a 36-cell nursery tray filled with soil-less growing mix. Moisten the soil, and drop two or three seeds on the surface of each cell. Using a pencil eraser, gently press the seeds into the soil, barely making a dent in the surface. Cover them with a thin layer of vermiculite or growing mix and water again to settle the seeds. At room temperature, germination should occur within a week. Thin to one plant per cell when true leaves have appeared. Feed after thinning, and again in 2 weeks with a balanced soluble fertilizer solution, and don't allow the growing medium to dry out. When roots protrude from the drainage holes, the plants are ready to transplant.

HARVESTING, STORING, AND PRESERVING

Harvest individual young spinach leaves for use in salads. You can repeat this harvest two or three times during the growing season. When the new leaves begin to develop pointed tips rather than rounded ones, it's time to harvest the entire crop. Pull up the entire plant, remove debris from the roots, but do not wash. Store the plants in plastic bags in the refrigerator for up to 1 week. Wash and trim them just before cooking.

Spinach is among the few green crops that freeze well. Prepare the leaves for cooking, immerse them in boiling water for 3 minutes, drain, plunge into ice water to stop the cooking, and drain thoroughly. Freeze in appropriate containers.

SPECIAL TIPS

“Winter” spinach varieties can tolerate freezing. They're planted in late fall, giving them just enough time to get established before winter weather stops their growth. When warmth returns in spring, they begin growing again for an early harvest.



Strawberry



Strawberries are not often considered an annual crop, but for much of the temperate zone, they are—not because they die after one season, but rather because they're not worth growing for a second or third year, due to decreased vigor. The reason is that all strawberries commonly available to home gardeners are the product of hybridization and breeding programs that sprang from the original cross of a wild North American strawberry with one from Asia.

Strawberries can be either day-length sensitive or day-length neutral. The latter, also called “everbearing” strawberries, are the best choice for the straw bale garden and yield a good crop in the fall following a spring planting.

WHEN TO PLANT

Plant strawberries in early spring, up to a month prior to the last expected frost in your area. They'll first establish a root system in the straw bales, and while doing so, they'll simply sit there, as far as you can tell from looking at the foliage. Then, as the weather warms up, they'll begin to grow and soon thereafter produce their first blooms.

Resist the temptation to allow the first blooms to produce berries. This robs the plant's strength, and the resulting harvest won't be impressive in any case. Pick off and discard the blooms. Continue to do so if a few blooms appear during the summer. Also cut off and discard any runners the plants may send out.

As the weather cools down at the end of the season, the plants should respond with a large flush of blooms. Leave these in place to produce a crop of berries. The crop will be large, succulent, and flavorful as a result of the plants' easy life during the summer.

HOW MUCH TO GROW

Each bale can accommodate six strawberry plants evenly spaced across the top. You can insert a few more plants in the sides of the bale, also. Each bale should produce 1 or 2 quarts of strawberries, depending on the specific variety you plant. You can increase your harvest by planting strawberries in the sides of bales hosting other crops on top.

PESTS AND DISEASES

Strawberries are seldom attacked by insects, but disease, especially from viruses, will take its toll. This is why it's recommended to start fresh with new strawberry plants each season, as the old ones will become exhausted. Even though the plants may look healthy, the harvest will get smaller and smaller with each passing season.

STARTING YOUR OWN SEEDS

Strawberries are never started from seed, but you can produce your own plants for the following season if you wish. Select healthy-looking runners from your healthiest plants. (Most varieties begin to produce runners after the first flush of spring blooms.) Fill some pots with growing mix, set them close to the bales, and place the chosen runners on top. The runners will root into the growing mix in about a week. At that point, detach the plant from its parent, and grow it in a separate location. The following spring, transplant to the straw bales.

HARVESTING, STORING, AND PRESERVING

Pick strawberries as they ripen, and use them immediately. They will keep under refrigeration for a few days, but the quality suffers.

Strawberries freeze well. Place individual strawberries, caps removed, pointed side up on a waxed paper-lined baking sheet, and freeze overnight. The next day, place the frozen berries in a reclosable container, and return them to the freezer.

You also can transform strawberries into delicious jam, preserves, and even pickles. Recipes are widely available.

SPECIAL TIPS

If you want your straw bale garden to have a decorative element, look for the recently developed strawberry varieties that produce large, showy pink or white flowers as well as edible fruit. Developed for container production, the plants are also compact and grow well in the confines of a straw bale.

Turnip and Rutabaga



These two related vegetables, both centuries old, are grown in the same manner and can be considered together. The main difference is that turnips can be grown in both spring and fall, whereas rutabaga, which takes longer to mature, is most often grown as a fall crop for winter storage.

WHEN TO PLANT

Plant turnips in either spring or fall. They can go into bales a month prior to the last spring frost date. Because they mature quickly, you can plant two crops in succession in locations where summers remain cool.

Rutabaga is typically harvested in fall after a late summer planting. The roots store very well under conditions of cold and humidity.

HOW MUCH TO GROW

A single straw bale should produce 24 small turnips or 8 average-size rutabagas. If you're growing turnips only for the delicious greens, sow them thickly and don't worry about root development. If you want roots, they need to be spaced 4 inches (10cm) apart each way. Although rutabaga greens are edible, you're aiming for large, sound roots, so give them wider spacing and allow them to keep all their leaves until they are mature.

Sow seeds after preparing the bale with soil-less growing mix. Cover them with a thin layer of growing mix, and water well. They should germinate within 2 weeks. Thin, if necessary, to the correct final spacing. This depends on whether you're growing turnips for greens, turnips for roots, or rutabaga.

PESTS AND DISEASES

Flea beetles and aphids attack both these crops if the plants are stressed by heat or lack of water. Water stress is unlikely in a straw bale garden, but an unexpectedly warm autumn might create issues. Control infestations with neem oil spray or the natural insecticide pyrethrin.

STARTING YOUR OWN SEEDS

Turnips are never transplanted. Rutabaga can be started in an 18-cell nursery tray filled with soil-less growing mix. Moisten the soil and drop two or three seeds on the surface of each cell. Using a pencil eraser, gently press the seeds into the soil, barely making a dent in the surface. Cover them with a thin layer of vermiculite or growing mix, water again to settle the seeds, and place under lights. At room temperature, germination should occur within a week. Thin to one plant per cell when true leaves have appeared. Feed after thinning, and again in 2 weeks with a balanced soluble fertilizer solution, and don't allow the growing medium to dry out. When roots protrude from the drainage holes in the cell tray, the plants are ready for transplant.

HARVESTING, STORING, AND PRESERVING

Harvest turnip greens when they have reached about 8 inches (20.25cm) in length or more. If you intend to leave the plants for roots, take only one or two leaves from each.

Harvest turnip roots when they've reached the size typical for the variety. It's better to harvest too young than to allow them to become overly mature, strongly flavored, and woody.

Harvest rutabaga when the roots have reached baseball to softball size.

For both turnips and rutabaga, cut off the leaves about 1 inch (2.5cm) from the root, and store the trimmed roots in a moisture-retentive container in the refrigerator for up to 6 months.

SPECIAL TIPS

Little breeding work has been carried out with rutabaga, but turnips are available in several varieties. Some cultivars are intended for use as greens, and the cultivars that produce roots come in different sizes and colors.



Upland Cress and Watercress



Contrary to popular belief, watercress does not need to be grown in water. Both upland cress and watercress can be used to fill small spaces in your straw bales, such as between two bales or on the ends or sides where less light may be available. Both tolerate a little shade, and both appreciate shade when the weather heats up.

WHEN TO PLANT

Upland cress and watercress can be grown as spring or fall crops. Both mature quickly and should be planted for harvest prior to the time when daytime temperatures exceed 80°F (26.5°C).

Even though watercress is a perennial in many parts of the world, it's best grown as an annual in the straw bale garden.

HOW MUCH TO GROW

Upland cress and watercress add a spicy note to salad mixes, and this is perhaps the best use for either one. A few plants tucked here and there among the other vegetables in your bales will probably be enough.

PESTS AND DISEASES

Disease seldom affects either upland cress or watercress, but either one is likely to attract a swarm of aphids if it becomes stressed. Stress arises when the temperature gets too high or the straw becomes too dry. Because straw bale gardens generally remain moist enough with regular attention, your biggest enemy is likely to be an unexpected warm-up. The plants grow to maturity so quickly, it's hardly worth the effort to combat aphids. Simply harvest what can be salvaged and wait for a more opportune time to replant.

STARTING YOUR OWN SEEDS

You can start watercress in small pots and transplant them to the bales, but it's better to direct sow upland cress where the plants are to grow.

For upland cress, use the soil-less growing mix method, and sprinkle the seeds thinly on the surface of the medium. Cover them with a thin layer of growing mix or vermiculite, and water thoroughly. They should germinate in about a week. Don't worry about thinning. Water them regularly, and they should be ready for harvest in 1 month to 6 weeks.

Start watercress in small pots of soil-less growing mix, scattering a few seeds on the surface and covering them with growing medium. Set the pots in a shallow dish, and keep the dish filled with water. This keeps the growing medium constantly moist. When the seeds germinate, thin them only if the pot seems crowded. Several plants growing together aren't a problem if they have enough moisture. When the plants are large enough to handle, move the whole clump to the straw bale. They should be ready to transplant 3 weeks after germination.

HARVESTING, STORING, AND PRESERVING

Harvest both watercress and upland cress on the day you intend to use the crop in the kitchen by cutting the leaves and stems at the soil line. Watercress often resprouts from the roots, whereas upland cress is less likely to do so. The quality of watercress will remain good as long as the weather stays cool and the plants get enough water.

Store freshly picked watercress or upland cress in a plastic bag in the refrigerator, and use within 3 days. These greens are never frozen for later use, as they lose all texture in the process.

SPECIAL TIPS

Upland cress tolerates both warmth and drought far more easily than watercress. Unless you just want to try your hand with the latter, rely on upland cress as your mainstay, at least for your first efforts at straw bale gardening. When you've gained some experience and have a better understanding of how vegetables respond to your local environment, you might have better luck with watercress.



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About the Author

John Tullock is the author of 17 how-to books and has written extensively on vegetable gardening, sustainable and self-sufficient living, and growing orchids. John's books include *Idiot's Guides: Vegetable Gardening*; *The New American Homestead: Sustainable, Self-Sufficient Living in the Country or in the City*; and *Pay Dirt: How to Make \$10,000 a Year from Your Backyard Garden*. In 2006, the American Horticulture Society honored his *Growing Hardy Orchids* with its Great Garden Book award.

John has written hundreds of articles for national and regional publications and blogs regularly about food gardening and sustainable living at johntullock.blogspot.com.